

Chronic Toxicity Testing of the Chevron/Cawelo Water District “Inlet to Reservoir B” Effluent

Sample collected January 11, 2010

Prepared For:

Chevron Energy Technology Co.
3901 Briarpark
Houston, TX 77042

Prepared By:

Pacific EcoRisk
2250 Cordelia Road
Fairfield, CA 94534

May 2010



PACIFIC ECORISK
ENVIRONMENTAL CONSULTING & TESTING

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Table of Contents

	Page
1. INTRODUCTION	1
2. TOXICITY TEST PROCEDURES	1
2.1 Sample Receipt and Handling	1
2.2 Algal Growth Toxicity Testing with <i>Selenastrum capricornutum</i>	1
2.2.1 Reference Toxicant Testing of the <i>Selenastrum capricornutum</i>	2
2.3 Survival and Reproduction Toxicity Testing with <i>Ceriodaphnia dubia</i>	2
2.3.1 Reference Toxicant Testing of the <i>Ceriodaphnia dubia</i>	3
2.4 Survival and Growth Toxicity Testing with Larval Fathead Minnows.....	3
2.4.1 Reference Toxicant Testing of the Larval Fathead Minnows	4
3. TOXICITY TESTING RESULTS	5
3.1 Effects of Chevron/Cawelo 'Inlet to Reservoir B' Effluent on <i>Selenastrum capricornutum</i>	5
3.1.1 Reference Toxicant Toxicity to <i>Selenastrum capricornutum</i>	6
3.2 Effects of Chevron/Cawelo 'Inlet to Reservoir B' Effluent on <i>Ceriodaphnia dubia</i>	7
3.2.1 Reference Toxicant Toxicity to <i>Ceriodaphnia dubia</i>	8
3.3 Effects of Chevron/Cawelo 'Inlet to Reservoir B' Effluent on Fathead Minnows	9
3.3.1 Reference Toxicant Toxicity to Fathead Minnows	10
5. SUMMARY AND CONCLUSIONS	11
5.1 QA/QC Summary	11

Appendices

- Appendix A Chain-of-Custody Record for the Collection and Delivery of the Chevron/Cawelo "Inlet to Reservoir B" Effluent Sample
- Appendix B Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Chevron/Cawelo "Inlet to Reservoir B" Effluent to *Selenastrum capricornutum*
- Appendix C Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Selenastrum capricornutum*
- Appendix D Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Chevron/Cawelo "Inlet to Reservoir B" Effluent to *Ceriodaphnia dubia*
- Appendix E Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Ceriodaphnia dubia*
- Appendix F Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Chevron/Cawelo "Inlet to Reservoir B" Effluent to Fathead Minnows
- Appendix G Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the Fathead Minnows

1. INTRODUCTION

Chevron USA Inc. and Cawelo Water District (Chevron/Cawelo) has contracted Pacific EcoRisk (PER) to perform an evaluation of the chronic toxicity of "Inlet to Reservoir B" effluent. This evaluation consisted of performing the following US EPA freshwater chronic toxicity tests:

- 96-hr algal growth test with the green alga *Selenastrum capricornutum*;
- 3-brood (6-8-day) survival and reproduction test with the crustacean *Ceriodaphnia dubia*; and
- 7-day survival and growth test with larval fathead minnows (*Pimephales promelas*).

This testing was performed using an effluent sample that was collected on January 11, 2010. In order to assess the sensitivity of the test organisms to chronic toxic stress, reference toxicant tests were also performed. This report describes the performance and results of these tests.

2. TOXICITY TEST PROCEDURES

The methods used in conducting the standard chronic toxicity tests followed EPA testing manual "Short-Term Methods for Estimating the Chronic Effects of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition" (EPA-821-R-02-013).

2.1 Sample Receipt and Handling

On January 11, a sample of the 'Inlet to Reservoir B' effluent was collected into appropriately cleaned sample containers. This sample was transported that same day, on ice and under chain-of-custody, to the PER laboratory in Fairfield. Upon receipt at the testing laboratory, aliquots of the sample were collected for analysis of initial water quality characteristics (Table 1), with the remainder of the samples being stored at 0-6°C except when being used to prepare test solutions. The chain-of-custody record for the collection and delivery of this sample is provided in Appendix A.

Table 1. Initial water quality characteristics of the Chevron/Cawelo effluent^a and other water samples

Sample ID	Temp (°C)	pH	D.O. (mg/L)	Alkalinity (mg/L)	Hardness (mg/L)	Conductivity (µS/cm)	Total Ammonia (mg/L N)
Inlet to Reservoir B	1.1	6.77	4.6	210	88	807	<1.0

2.2 Algal Growth Toxicity Testing with *Selenastrum capricornutum*

The chronic algal toxicity test consists of a 96-hr bioassay in which the green alga *Selenastrum capricornutum* is exposed to effluent and the effects on cellular reproduction determined. The specific procedures used in this test are described below.



The Lab Water Control for this test consisted of Type 1 lab water (reverse osmosis, de-ionized water). Aliquots of the Lab Water Control and the effluent sample were spiked with nutrients and then filtered (using sterile 0.45 µm filters) before use in the algal test, as per EPA guidelines. The nutrient-amended, filtered Lab Water Control and effluent were used to prepare test solutions at the 12.5, 25, 50, 75, and 100% effluent concentrations. Routine water quality characteristics (pH, D.O., and conductivity) were measured on these test solutions prior to their use in the test.

There were 4 replicates for each test treatment, each consisting of a 250-mL glass Erlenmeyer flask containing 100 mL of test solution. Each flask was inoculated to an initial cell density of 10,000 cells/mL of *Selenastrum* from an ongoing PER laboratory culture that is maintained in log growth phase. These flasks were loosely capped and randomly positioned within a temperature-controlled room at 25°C, under continuous cool-white fluorescent illumination. Each replicate flask was shaken a minimum of 3 times daily. The temperature and pH were determined daily for the designated “water quality” replicate at each treatment.

After 96 (± 2) hrs exposure, the algal cell density in each replicate flask was determined by spectrophotometric analysis. The resulting cell density data were analyzed to evaluate any impairment of algal growth caused by the effluent; all statistical analyses were performed using the CETIS® statistical software.

2.2.1 Reference Toxicant Testing of the *Selenastrum capricornutum*

In order to assess the sensitivity of the *Selenastrum* to toxic stress, a concurrent reference toxicant test was performed. The reference toxicant test was performed similarly to the effluent test except that test solutions consisted of Lab Water Control media spiked with NaCl at concentrations of 0.5, 1, 2, 4, and 8 gm/L. The resulting test response data were statistically analyzed to determine key dose-response point estimates (e.g., IC₅₀); all statistical analyses were made using the CETIS® software. These response endpoints were then compared to the “typical response” range established by the mean \pm 2 SD of the point estimates generated by the most recent previous reference toxicant tests performed by this lab.

2.3 Survival and Reproduction Toxicity Testing with *Ceriodaphnia dubia*

The short-term chronic *Ceriodaphnia* test consists of exposing individual females to effluent for the length of time it takes for the Lab Control treatment females to produce 3 broods (typically 6-8 days), after which effects on survival and reproduction are evaluated. The specific procedures used in this test are described below.

The Lab Water Control for this test consisted of a mixture of Type 1 lab water and a commercial spring water (Perrier®). The Lab Water Control and effluent were used to prepare test solutions at the 12.5, 25, 50, 75, and 100% effluent concentrations. For each treatment, 200 mL of test solution was amended with the alga *Selenastrum capricornutum* and Yeast-Cerophyll®-Trout Food (YCT) to provide food for the test organisms. “New” water quality characteristics (pH,

D.O., and conductivity) were measured on these food-amended test solutions prior to use in this test. Each day of the test, fresh test solutions and a “new” set of replicate cups were prepared and characterized, as before.

There were 10 replicates for each test treatment, each replicate consisting of 15 mL of test solution in a 30-mL plastic cup. The test was initiated by allocating one neonate (<24 hrs old) *Ceriodaphnia*, obtained from ongoing laboratory cultures, into each replicate. The replicate cups were placed into a temperature-controlled room at 25°C, under cool-white fluorescent lighting on a 16L:8D photoperiod.

Each test replicate cup was examined daily, with surviving “original” individual organisms being transferred to the corresponding new cup containing fresh test solution. The contents of each remaining “old” replicate cup were carefully examined, and the number of neonate offspring produced by each original organism was determined, after which “old” water quality characteristics (pH, D.O., and conductivity) were measured for the “old” media from one randomly-selected replicate at each treatment.

After it was determined that ≥60% of the *Ceriodaphnia* in the Lab Water Control treatment had produced their third brood of offspring, the test was terminated. The resulting survival and reproduction (number of offspring) data were analyzed to evaluate any impairment(s) caused by the effluent; all statistical analyses were performed using the CETIS® statistical software.

2.3.1 Reference Toxicant Testing of the *Ceriodaphnia dubia*

In order to assess the sensitivity of the *Ceriodaphnia* test organisms to toxic stress, a concurrent reference toxicant test was performed. The reference toxicant test was performed similarly to the effluent test except that test solutions consisted of Lab Water Control media spiked with NaCl at test concentrations of 500, 1000, 1500, 2000, and 2500 mg/L. The resulting test response data were statistically analyzed to determine key dose-response point estimates (e.g., EC50); all statistical analyses were made using the CETIS® software. These response endpoints were then compared to the “typical response” ranges established by the mean ± 2 SD of the point estimates generated by the most recent previous reference toxicant tests performed by this lab.

2.4 Survival and Growth Toxicity Testing with Larval Fathead Minnows

The chronic fathead minnow test consists of exposing larval fish to effluent for 7 days, after which effects on survival and growth are evaluated. The specific procedures used in this test are described below.

The Lab Water Control for this test consisted of USEPA synthetic moderately-hard water (prepared by addition of ACS-reagent grade chemicals to Type 1 lab water). The Lab Water Control and effluent were used to prepare test solutions at the 12.5, 25, 50, 75, and 100% effluent

concentrations. Fresh test solutions were prepared daily. "New" water quality characteristics (pH, D.O., and conductivity) were measured on these test solutions prior to use in the tests.

There were 4 replicates at each test treatment, each replicate consisting of 400 mL of test media in a 600-mL glass beaker. This test was initiated by randomly allocating 10 larval fathead minnows (<48 hrs old) into each replicate. The replicate beakers were placed in a temperature-controlled room at 25°C, under cool-white fluorescent lighting on a 16L:8D photoperiod. The test fish were fed brine shrimp nauplii twice daily.

Each replicate was examined daily, with any dead animals, uneaten food, wastes, and other detritus being removed. The number of live fish in each replicate was determined and then approximately 80% of the test media in each beaker was carefully poured out and replaced with fresh test solution. "Old" water quality characteristics (pH, D.O., and conductivity) were measured on the old test water that had been discarded from one randomly-selected replicate at each treatment.

After 7 days exposure, the number of live fish in each replicate beaker was recorded. The fish from each replicate were then carefully euthanized in methanol, rinsed in de-ionized water, and transferred to a pre-dried and pre-tared weighing pan. These fish were then dried at 100°C for >24 hrs and re-weighed to determine the total weight of fish in each replicate; the total weight was then divided by the initial number of fish per replicate (n=10) to determine the "biomass value". The resulting survival and growth ("biomass value") data were analyzed to evaluate any impairment(s) caused by the effluent; all statistical analyses were performed using the CETIS® statistical software.

2.4.1 Reference Toxicant Testing of the Larval Fathead Minnows

In order to assess the sensitivity of the fish to toxic stress, a concurrent reference toxicant test was performed. The reference toxicant test was performed similarly to the effluent test, except that test solutions consisted of Lab Water Control media spiked with NaCl at test concentrations of 0.75, 1.5, 3, 6, and 9 gm/L. The resulting test response data were analyzed to determine key dose-response point estimates (e.g., EC50); all statistical analyses were made using the CETIS® software. These response endpoints were then compared to the "typical response" ranges established by the mean \pm 2 SD of the point estimates generated by the most recent previous reference toxicant tests performed by this lab.

3. TOXICITY TESTING RESULTS

3.1 Effects of Chevron/Cawelo 'Inlet to Reservoir B' Effluent on *Selenastrum capricornutum*

The results of this test are summarized below in Table 2. There was a mean final algal cell density of 1,950,000 cells/mL at the Lab Water Control treatment. There were no significant reductions in algal cell density in the 'Inlet to Reservoir B' effluent; the NOEC was 100% effluent, resulting in 1 TUC (where TUC = 100/NOEC).

The test data and summary of statistical analyses for this test are presented in Appendix B.

Table 2. Effects of Chevron/Cawelo 'Inlet to Reservoir B' effluent on *Selenastrum capricornutum*.

Effluent Treatment	Mean Cell Density (cells/mL x 10 ⁶)
Lab Water Control	1.95
12.5%	2.53
25%	2.62
50%	2.57
75%	2.61
100%	2.62
Summary of Statistics	
NOEC =	100% effluent
TUC (where TUC = 100/NOEC) =	1
Algal Growth IC ₂₅ =	>100% effluent
Algal Growth IC ₅₀ =	>100% effluent

3.1.1 Reference Toxicant Toxicity to *Selenastrum capricornutum*

The results of this test are summarized below in Table 3. There was a mean of 2,210,000 cells/mL in the Lab Water Control treatment. The IC₅₀ was 1.6 gm/L NaCl.

These reference toxicant test results are consistent with the "typical response" range established by previous *Selenastrum* reference toxicant tests performed in this laboratory, indicating that these organisms were responding to toxic stress in a typical fashion.

The test data and summary of statistical analyses for this test are presented in Appendix C.

Table 3. Reference toxicant testing: Effects of NaCl on *Selenastrum capricornutum*.

NaCl Treatment (gm/L)	Mean Cell Density (cells/mL x 10 ⁶)
Lab Water Control	2.21
0.5	1.84*
1	1.42*
2	0.90*
4	0.13*
8	0.06*

Summary of Statistics	
NOEC =	<0.5 gm/L NaCl
Algal Growth IC ₅₀ =	1.6 gm/L NaCl

* - The response at this test treatment was significantly less than the Lab Control treatment response at p < 0.05.

3.2 Effects of Chevron/Cawelo 'Inlet to Reservoir B' Effluent on *Ceriodaphnia dubia*

The results of this test are summarized below in Table 4. There was 100% survival at the Lab Water Control treatment. There were no significant reductions in survival in the 'Inlet to Reservoir B' effluent; the survival NOEC was 100% effluent, resulting in 1 TUC (where TUC = 100/NOEC).

There was a mean of 28.2 offspring per female at the Lab Water Control treatment. There were significant reductions in reproduction at the 100% 'Inlet to Reservoir B' effluent concentration; the reproduction NOEC was 75% effluent, resulting in 1.3 TUC (where TUC = 100/NOEC).

The test data and summary of statistical analyses for this test are presented in Appendix D.

Table 4. Effects of Chevron/Cawelo 'Inlet to Reservoir B' effluent on *Ceriodaphnia dubia*.

Effluent Treatment	% Survival	Reproduction (# neonates/female)
Lab Water Control	100	28.2
12.5%	90	32.1
25%	100	35.2
50%	100	34.4
75%	100	30.1
100%	100	19.6*
Summary of Statistics		
No Observable Effect Concentration (NOEC) =	100% effluent	75% effluent
TUC (where TUC = 100/NOEC) =	1	1.3
Survival EC25 or Reproduction IC25 =	>100% effluent ^a	88% effluent
Survival EC50 or Reproduction IC50 =	>100% effluent ^a	>100% effluent

* - The response at this test treatment was significantly less than the Lab Control treatment response at p < 0.05.

a - Due to the absence of significant mortalities, the EC point estimates could not be calculated, but can be assumed to be >100% effluent

3.2.1 Reference Toxicant Toxicity to *Ceriodaphnia dubia*

The results of this test are summarized below in Table 5. There was 100% survival and a mean of 25.9 neonates per female at the Lab Water Control treatment. The survival EC₅₀ was 1730 mg/L NaCl, and the reproduction IC₅₀ was 1190 mg/L NaCl.

These reference toxicant test results are consistent with the "typical response" ranges established by previous *Ceriodaphnia dubia* reference toxicant tests performed in this laboratory, indicating that these organisms were responding to toxic stress in a typical fashion.

The test data and the summary of statistical analyses for this test are presented in Appendix E.

Table 5. Reference toxicant testing: Effects of NaCl on *Ceriodaphnia dubia*

NaCl Treatment (mg/L)	% Survival	Reproduction (# neonates/female)
Lab Water Control	100	25.9
500	100	22.5
1000	100	16.2*
1500	100	8.8*
2000	0*	-
2500	0*	-

Summary of Key Statistics

Survival EC ₅₀ or Reproduction IC ₅₀ =	1730 mg/L NaCl	1190 mg/L NaCl
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* - The response at this test treatment was significantly less than the Lab Control treatment response at p < 0.05.

3.3 Effects of Chevron/Cawelo 'Inlet to Reservoir B' Effluent on Fathead Minnows

The results of this test are summarized below in Table 6. There was 90% survival at the Lab Water Control treatment. There were significant reductions in survival at the $\geq 50\%$ 'Inlet to Reservoir B' effluent concentrations; the NOEC was 25% effluent, resulting in 4 TUC (where $TUC = 100/NOEC$).

There was a mean 'biomass value' of 0.31 mg at the Lab Water Control treatment. There were significant reductions in growth at the 25% 'Inlet to Reservoir B' effluent concentration; the growth NOEC was 12.5% effluent, resulting in 8 TUC.

The test data and the summary of statistical analyses for this test are presented in Appendix F.

Table 6. Effects of Chevron/Cawelo 'Inlet to Reservoir B' effluent on fathead minnows.

Effluent Treatment	% Survival	Mean Fish Biomass Value (mg)
Lab Water Control	90	0.31
12.5%	90	0.30
25%	75	0.19*
50%	7.5*	0.01
75%	0*	-
100%	0*	-
Summary of Statistics		
No Observable Effect Concentration (NOEC) =	25% effluent	12.5% effluent
TUC (where TUC = 100/NOEC) =	4	8
Survival EC ₂₅ or Growth IC ₂₅ =	27% effluent	20% effluent
Survival EC ₅₀ or Growth IC ₅₀ =	33% effluent	29% effluent

* - The response at this test treatment was significantly less than the Lab Control treatment response at $p < 0.05$.

3.3.1 Reference Toxicant Toxicity to Fathead Minnows

The results of this test are summarized below in Table 7. There was 97.5% survival and a mean biomass value of 0.24 mg at the Lab Control treatment. The survival EC₅₀ was 3.7 gm/L NaCl and the growth IC₅₀ was 3.6 gm/L NaCl.

These reference toxicant test results are consistent with the "typical response" ranges established by previous fathead minnow reference toxicant tests performed in this laboratory, indicating that these organisms were responding to toxic stress in a typical fashion.

The test data and summary of statistical analyses for this test are presented in Appendix G.

Table 7. Reference toxicant testing: effects of NaCl on fathead minnows.

NaCl Treatment (gm/L)	% Survival	Mean Fish Biomass Value (mg)
Lab Control	97.5	0.24
0.75	92.5	0.23
1.5	77.5	0.20
3	72.5*	0.16
6	2.5*	0.0
9	0*	-

Summary of Statistics

Survival EC ₅₀ or Growth IC ₅₀ =	3.7 gm/L NaCl	3.6 gm/L NaCl
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* - The response at this test treatment was significantly less than the Lab Control treatment response at p < 0.05.

5. SUMMARY AND CONCLUSIONS

Effects of “Inlet to Reservoir B” Effluent on *Selenastrum capricornutum*

There were no significant reductions in algal growth in the ‘Inlet to Reservoir B’ effluent; the NOEC was 100% effluent, resulting in 1 TUc (where TUc = 100/NOEC).

Effects of “Inlet to Reservoir B” Effluent on *Ceriodaphnia dubia*

There were no significant reductions in survival in the ‘Inlet to Reservoir B’ effluent; the survival NOEC was 100% effluent, resulting in 1.0 TUc. However, there were significant reductions in reproduction at the 100% ‘Inlet to Reservoir B’ effluent concentration; the reproduction NOEC was 75% effluent, resulting in 1.3 TUc (where TUc = 100/NOEC).

Effects of “Inlet to Reservoir B” Effluent on Fathead Minnows

There were significant reductions in survival at the ≥50% ‘Inlet to Reservoir B’ effluent concentrations; the survival NOEC was 25% effluent, resulting in 4 TUc (where TUc = 100/NOEC). There were further significant reductions in growth at the 25% effluent concentration; the growth NOEC was 12.5% effluent, resulting in 8 TUc.

5.1 QA/QC Summary

Test Conditions – Test conditions (pH, D.O., temperature, etc.) were all within acceptable limits for these tests. All analyses were performed according to laboratory Standard Operating Procedures.

Negative Lab Control – The biological responses in the Lab Water Control treatments for these tests were within acceptable limits.

Positive Control – The results of the concurrent reference toxicant tests were consistent with the “typical response” ranges established by previous reference toxicant tests performed in our lab, indicating that the test organisms used in the current tests were responding to toxic stress in a typical and consistent fashion.

Concentration Response Relationships – There were valid concentration-response relationships for the reference toxicant tests, which were determined to be acceptable for this testing.

Appendix A

Chain-of-Custody Record for the Collection and Delivery of the Chevron/Cawelo ‘Inlet to Reservoir B’ Effluent Sample

CHAIN OF CUSTODY RECORD

PACIFIC ECORISK

2250 Cordelia Rd

Fairfield, CA 94534

Ph: (707) 207-7760

Fax: (707) 207-7916

www.pacificecorisk.com

RESULTS TO:

Pacific Ecorisk

PROJECT:

		BILL TO:		PRECISION ANTHROPOLOGY	
				3211974 ST.	
				BARTONSPURD, CA 93301	
		Attn:		ACQUISITIONS DEPT	
		Phone:		661-323-1682	
		Email:		Shawn@paclab-inc.com	

METHOD OF SHIPMENT:

FedEx

UPS:

HAND:

OTHER:

COMMENTS:

ANALYSES REQUESTED

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE MATRIX	GRAB/COMP.	# CONTAINER/TYPE	REMARKS	
INLET TO RES. B	01/11/09	8:30	W	GRAB	20 / PLASTIC	#1	
VALLEY WASTE		8:40			4 / PLASTIC	#2	
OUTLET TO CANAL		9:20			4 / PLASTIC	#3	
PRE-POSO CREEK		9:55			4 / PLASTIC	#4	
SPLITTER BOX		11:00			2 / PLASTIC	#5	
WETLANDS	01/11/09	12:30	↓	↓	2 / PLASTIC	#6	
					/		
					/		
					/		

CODES: CONTRACTOR

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	PAGE #
Stephanie	1/11/09	13:55	Debra M.	1/11/09	13:55	OF
Dawn	1/11/09	14:01		1/11/09	14:01	

WHITE - RETURN W/SAMPLE
18/63 YELLOW - KEEP FOR YOUR RECORDS

18/63 YELLOW - KEEP FOR YOUR RECORDS

Appendix B

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Chevron/Cawelo "Inlet to Reservoir B" Effluent to *Selenastrum capricornutum*

CETIS Summary Report

Report Date: 28 Jan-10 14:27 (p 1 of 1)
 Test Code: 08-5548-2382/37371

Algal Growth Test							Pacific EcoRisk				
Batch ID:	00-8331-0619	Test Type:	Cell Growth	Analyst:	Jason Walker						
Start Date:	12 Jan-10 16:00	Protocol:	EPA-821-R-02-013 (2002)	Diluent:	Laboratory Water						
Ending Date:	16 Jan-10 15:00	Species:	Selenastrum capricornutum	Brine:	Not Applicable						
Duration:	95h	Source:	In-House Culture	Age:	6						
Sample ID:	15-0104-2531	Code:	Eff	Client:	Precision Analytical						
Sample Date:	11 Jan-10 07:30	Material:	Effluent	Project:	15508						
Receive Date:	11 Jan-10 19:01	Source:	Precision Analytical								
Sample Age:	32h (1.1 °C)	Station:	Inlet Resv B								
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
08-8738-4590	96h Cell Density-with EDTA	100	>100	N/A	14.6%	1	Dunnett's Multiple Comparison Test				
Point Estimate Summary											
Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method				
02-5513-2136	96h Cell Density-with EDTA	IC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)				
		IC10	>100	N/A	N/A	<1					
		IC15	>100	N/A	N/A	<1					
		IC20	>100	N/A	N/A	<1					
		IC25	>100	N/A	N/A	<1					
		IC40	>100	N/A	N/A	<1					
		IC50	>100	N/A	N/A	<1					
96h Cell Density-with EDTA Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	1.95E+6	1.92E+6	1.98E+6	1.88E+6	2.07E+6	1.60E+4	8.76E+4	4.49%	0.0%
12.5		4	2.53E+6	2.49E+6	2.57E+6	2.43E+6	2.69E+6	2.06E+4	1.13E+5	4.46%	-29.6%
25		4	2.62E+6	2.54E+6	2.69E+6	2.37E+6	2.84E+6	3.60E+4	1.97E+5	7.55%	-34.1%
50		4	2.57E+6	2.46E+6	2.68E+6	2.14E+6	2.73E+6	5.24E+4	2.87E+5	11.2%	-31.8%
75		4	2.61E+6	2.59E+6	2.62E+6	2.57E+6	2.66E+6	8.22E+3	4.50E+4	1.73%	-33.7%
100		4	2.62E+6	2.56E+6	2.68E+6	2.39E+6	2.74E+6	2.88E+4	1.58E+5	6.02%	-34.5%
96h Cell Density-with EDTA Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Lab Water Contr	1.88E+6	1.96E+6	1.89E+6	2.07E+6						
12.5		2.69E+6	2.43E+6	2.49E+6	2.50E+6						
25		2.68E+6	2.57E+6	2.84E+6	2.37E+6						
50		2.69E+6	2.73E+6	2.14E+6	2.72E+6						
75		2.66E+6	2.57E+6	2.63E+6	2.57E+6						
100		2.74E+6	2.39E+6	2.69E+6	2.67E+6						

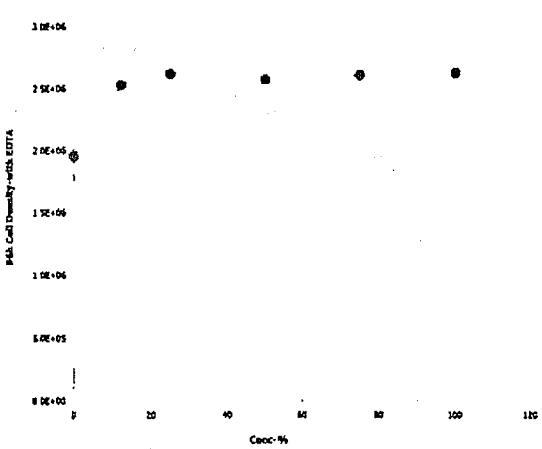
CETIS Analytical Report

Report Date: 28 Jan-10 14:27 (p 1 of 1)
 Test Code: 08-5548-2382/37371

Algal Growth Test								Pacific EcoRisk			
Analysis ID:	08-8738-4590	Endpoint:	96h Cell Density-with EDTA				CETIS Version:	CETISv1.7.0			
Analyzed:	28 Jan-10 14:27	Analysis:	Parametric-Control vs Treatments				Official Results:	Yes			
Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD			
Untransformed	0	C > T	Not Run	100	>100	N/A	1	14.6%			
Dunnett's Multiple Comparison Test											
Control	vs	Conc-%	Test Stat	Critical	MSD	P-Value	Decision(5%)				
Lab Water Control	12.5		-4.87	2.41	285000	1.0000	Non-Significant Effect				
	25		-5.61	2.41	285000	1.0000	Non-Significant Effect				
	50		-5.23	2.41	285000	1.0000	Non-Significant Effect				
	75		-5.55	2.41	285000	1.0000	Non-Significant Effect				
	100		-5.67	2.41	285000	1.0000	Non-Significant Effect				
ANOVA Table											
Source	Sum Squares		Mean Square		DF	F Stat	P-Value	Decision(5%)			
Between	1.384071E+12		2.768142E+11		5	9.84	0.0001	Significant Effect			
Error	5.06125E+11		28118050000		18						
Total	1.890196E+12		3.049322E+11		23						
ANOVA Assumptions											
Attribute	Test		Test Stat	Critical	P-Value	Decision(1%)					
Variances	Bartlett Equality of Variance		9.15	15.1	0.1032	Equal Variances					
Distribution	Shapiro-Wilk Normality		0.917		0.0501	Normal Distribution					
96h Cell Density-with EDTA Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	1.95E+6	1.92E+6	1.98E+6	1.88E+6	2.07E+6	1.63E+4	8.76E+4	4.49%	0.0%
12.5		4	2.53E+6	2.48E+6	2.57E+6	2.43E+6	2.69E+6	2.09E+4	1.13E+5	4.46%	-29.6%
25		4	2.62E+6	2.54E+6	2.69E+6	2.37E+6	2.84E+6	3.67E+4	1.97E+5	7.55%	-34.1%
50		4	2.57E+6	2.46E+6	2.68E+6	2.14E+6	2.73E+6	5.33E+4	2.87E+5	11.2%	-31.8%
75		4	2.61E+6	2.59E+6	2.62E+6	2.57E+6	2.66E+6	8.36E+3	4.50E+4	1.73%	-33.7%
100		4	2.62E+6	2.56E+6	2.68E+6	2.39E+6	2.74E+6	2.93E+4	1.58E+5	6.02%	-34.5%
Graphics											

CETIS Analytical Report

Report Date: 28 Jan-10 14:27 (p 1 of 1)
 Test Code: 08-5548-2382/37371

Algal Growth Test						Pacific EcoRisk					
Analysis ID: 02-5513-2136 Analyzed: 28 Jan-10 14:27	Endpoint: 96h Cell Density-with EDTA Analysis: Linear Interpolation (ICPIN)				CETIS Version: CETISv1.7 0 Official Results: Yes						
Linear Interpolation Options											
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method						
Log(X+1)	Linear	57951	200	Yes	Two-Point Interpolation						
Point Estimates											
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL					
IC5	>100	N/A	N/A	<1	N/A	N/A					
IC10	>100	N/A	N/A	<1	N/A	N/A					
IC15	>100	N/A	N/A	<1	N/A	N/A					
IC20	>100	N/A	N/A	<1	N/A	N/A					
IC25	>100	N/A	N/A	<1	N/A	N/A					
IC40	>100	N/A	N/A	<1	N/A	N/A					
IC50	>100	N/A	N/A	<1	N/A	N/A					
96h Cell Density-with EDTA Summary						Calculated Variate					
Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%		
0	Lab Water Contr	4	1.95E+6	1.88E+6	2.07E+6	1.60E+4	8.76E+4	4.49%	0.0%		
12.5		4	2.53E+6	2.43E+6	2.69E+6	2.06E+4	1.13E+5	4.46%	-29.6%		
25		4	2.62E+6	2.37E+6	2.84E+6	3.60E+4	1.97E+5	7.55%	-34.1%		
50		4	2.57E+6	2.14E+6	2.73E+6	5.24E+4	2.87E+5	11.2%	-31.8%		
75		4	2.61E+6	2.57E+6	2.66E+6	8.22E+3	4.50E+4	1.73%	-33.7%		
100		4	2.62E+6	2.39E+6	2.74E+6	2.88E+4	1.58E+5	6.02%	-34.5%		
96h Cell Density-with EDTA Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Lab Water Control	1.88E+6	1.96E+6	1.89E+6	2.07E+6						
12.5		2.69E+6	2.43E+6	2.49E+6	2.50E+6						
25		2.68E+6	2.57E+6	2.84E+6	2.37E+6						
50		2.69E+6	2.73E+6	2.14E+6	2.72E+6						
75		2.66E+6	2.57E+6	2.63E+6	2.57E+6						
100		2.74E+6	2.39E+6	2.69E+6	2.67E+6						
Graphics											
											

***Selenastrum capricornutum* Cell Density Enumeration Data**Client: P. Analytical - Chevron CaweloInitial Count: 10,000 cells/mLTest Material: Inlet to Res BEnumerating Scientist: JRTest Start Date: 1/12/10Start Time: 1600Project #: 15508Test End Date: 1/16/10End Time: 1500Test ID #: 37371

Treatment	Rep A	Rep B	Rep C	Rep D	Mean
Lab Water Control	1.88	1.94	1.89	2.07	1.95
12.5%	2.69	2.43	2.49	2.50	2.53
25%	2.68	2.57	2.84	2.37	2.62
50%	2.69	2.73	2.14	2.72	2.57
75%	2.66	2.57	2.63	2.57	2.61
100%	2.74	2.39	2.69	2.67	2.62
This datasheet has been reviewed for completeness and consistency with Test Acceptability Criteria and/or other issues of concern.	Control Mean Density (cells/mL x 10 ⁶)	% CV	Date:	Time:	Signoff:
	1.95	4.5	1-16-10	1810	JR

***Selenastrum capricornutum* Algal Toxicity Test Water Quality Data**

Client: P. Analytical - Chevron Cawelo Test ID #: 37371 Test Date: 1/12/10
 Test Material: Inlet to Res B Project #: 15508 Control/Diluent: Lab Water
 Shelf #: R451

Test Treatment	Temp (°C)	pH	D.O. (mg/L)	Conductivity ($\mu\text{S}/\text{cm}$)	Sign-Off
Lab Water Control	24.8	7.49	10.0	119	Date: 1/13/10 Sample ID: 23371 Test Solution Prep: SG New NO: 000 Inoculation Time: 11:00 Inoculation Signoff: SG
12.5% Effluent	24.8	7.53	9.8	208	
25% Effluent	24.8	7.32	9.6	307	
50% Effluent	24.8	7.13	9.5	503	
75% Effluent	24.8	7.08	9.5	704	
100% Effluent	24.8	7.15	9.4	901	
Meter ID:	47	pH09	R003	EC04	
Lab Water Control	24.8	8.05			Date: 1/13/10 WQ Meter: 130 WQ Signoff: 008
12.5% Effluent	24.8	7.86			
25% Effluent	24.8	7.95			
50% Effluent	24.8	8.03			
75% Effluent	24.8	8.13			
100% Effluent	24.8	8.21			
Meter ID:	11	pH09			
Lab Water Control	25.3	8.17			Date: 01/14/10 WQ Meter: 10:55 WQ Signoff: SG
12.5% Effluent	25.3	8.63			
25% Effluent	25.3	8.61			
50% Effluent	25.3	8.59			
75% Effluent	25.3	8.62			
100% Effluent	25.3	8.66			
Meter ID:	47	pH14			
Lab Water Control	24.6	9.39			Date: 1/15/10 WQ Meter: 0915 WQ Signoff: HV
12.5% Effluent	24.6	9.61			
25% Effluent	24.6	9.55			
50% Effluent	24.6	9.42			
75% Effluent	24.6	9.34			
100% Effluent	24.6	9.24			
Meter ID:	47	pH 09			
Lab Water Control	25.2	9.98	13.1	114	Date: 1/16/10 Termination Time: 1500 Termination Signoff: ST
12.5% Effluent	25.2	10.17	14.3	221	
25% Effluent	25.2	9.98	15.6	314	
50% Effluent	25.2	9.66	14.7	490	WQ Meter: 1150
75% Effluent	25.2	9.58	14.8	657	WQ Signoff: NVS
100% Effluent	25.2	9.32	14.5	811	
Meter ID:	47	pH 14	R003	EC03	

Initial Test Conditions	Alkalinity	Hardness	Light Intensity (ftc)
	24	102	112

Appendix C

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Selenastrum capricornutum*

CETIS Summary Report

Report Date: 31 Jan-10 20:00 (p 1 of 1)
 Test Code: 09-4510-8943/37375

Algal Growth Test							Pacific EcoRisk				
Batch ID:	09-0921-2901	Test Type:	Cell Growth	Analyst:	Padrick Anderson						
Start Date:	12 Jan-10 16:00	Protocol:	EPA-821-R-02-013 (2002)	Diluent:	Laboratory Water						
Ending Date:	16 Jan-10 15:45	Species:	Selenastrum capricornutum	Brine:	Not Applicable						
Duration:	96h	Source:	In-House Culture	Age:	6						
Sample ID:	19-0801-6506	Code:	NaCl	Client:	Reference Toxicant						
Sample Date:	12 Jan-10 16:00	Material:	Sodium chloride	Project:	15612						
Receive Date:	12 Jan-10 16:00	Source:	Reference Toxicant								
Sample Age:	N/A (24.8 °C)	Station:	In House								
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
18-9471-3076	96h Cell Density-with EDTA <0.5	0.5	N/A	4.03%			Dunnett's Multiple Comparison Test				
Point Estimate Summary											
Analysis ID	Endpoint	Level	g/L	95% LCL	95% UCL	TU	Method				
06-2229-1929	96h Cell Density-with EDTA	IC5	0.131	0.0928	0.205		Linear Interpolation (ICPIN)				
		IC10	0.28	0.194	0.449						
		IC15	0.448	0.303	0.614						
		IC20	0.581	0.455	0.697						
		IC25	0.703	0.591	0.806						
		IC40	1.15	0.989	1.27						
		IC50	1.56	1.43	1.65						
96h Cell Density-with EDTA Summary											
Conc-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Mln	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	2.21E+6	2.18E+6	2.23E+6	2.16E+6	2.31E+6	1.29E+4	7.05E+4	3.2%	0.0%
0.5		4	1.84E+6	1.61E+6	1.86E+6	1.73E+6	1.93E+6	1.60E+4	8.77E+4	4.76%	16.4%
1		4	1.42E+6	1.40E+6	1.43E+6	1.37E+6	1.48E+6	9.25E+3	5.07E+4	3.58%	35.8%
2		4	9.04E+5	8.96E+5	9.13E+5	8.77E+5	9.31E+5	4.04E+3	2.21E+4	2.45%	59.0%
4		4	1.28E+5	1.19E+5	1.36E+5	9.90E+4	1.56E+5	4.25E+3	2.33E+4	18.3%	94.2%
8		4	5.83E+4	5.39E+4	6.26E+4	4.80E+4	7.30E+4	2.12E+3	1.16E+4	19.9%	97.4%
96h Cell Density-with EDTA Detail											
Conc-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Lab Water Contr	2.31E+6	2.16E+6	2.17E+6	2.18E+6						
0.5		1.73E+6	1.89E+6	1.82E+6	1.93E+6						
1		1.37E+6	1.48E+6	1.38E+6	1.43E+6						
2		9.02E+5	9.07E+5	8.77E+5	9.31E+5						
4		9.90E+4	1.56E+5	1.29E+5	1.26E+5						
8		5.00E+4	7.30E+4	6.20E+4	4.80E+4						

***Selenastrum capricornutum* Cell Density Enumeration Data**

Client: Reference Toxicant Initial Count: 10,000 cells/mL
 Test Material: NaCl Enumerating Scientist: SH
 Test Start Date: 1/12/10 Start Time: 14:00 Test ID #: 37375
 Test End Date: 1/16/10 End Time: 15:45 Project #: 15612

Treatment	Rep A	Rep B	Rep C	Rep D	Mean
Lab Water Control (w/EDTA)	2.31	2.16	2.17	2.18	2.21 2.20 JH
0.5	1.73	1.89	1.82	1.93	1.84
1	1.37	1.48	1.38	1.43	1.42
2	0.902	0.907	0.877	0.931	0.904
4	0.099	0.156	0.129	0.126	0.128
8	0.050	0.073	0.062	0.068	0.058
This datasheet has been reviewed for completeness and consistency with Test Acceptability Criteria and/or other issues of concern.	Control Mean Density (cells/mL x 10 ⁶)	% CV	Date:	Time:	Signoff:
	2.20	3.2	1-16-10	18:10	JZ

***Selenastrum capricornutum* Algal Toxicity Test Water Quality Data**

Client: Reference Toxicant Test ID #: 37375 Shelf Zone #: KUSI
 Test Material: NaCl Project #: 15612 Control/Diluent: Lab Water

Reference Toxicant Test Treatment (g/L NaCl)	Temp (°C)	pH	D.O. (mg/L)	Conductivity (µS/cm)	Sign-Off
Lab Water Control	24.8	7.49	9.5	114	Date: 1/12/10 Test Solution Prep: SH Initial WQ: 0 Inoculation Time: 11:00 Inoculation Sign-off: 84 ET Stock瓶读数: 416
0.5	24.8	7.57	9.6	1177	
1	24.8	7.56	9.4	2063	
2	24.8	7.53	9.3	3840	
4	24.8	7.49	9.4	7290	
8	24.8	7.45	9.4	14120	
Meter ID:	47	pH09	R003	EC0304	
Lab Water Control	25.7	8.49			Date: 1/13/10
0.5	25.7	8.31			WQ Time: 11:35
1	25.7	8.20			WQ Sign-off: 003
2	25.7	NR			
4	25.7	8.07			
8	25.7	7.98			
Meter ID:	47	pH14			Date: 01/14/10
Lab Water Control	25.3	8.58			WQ Time: 10:55
0.5	25.3	8.34			WQ Sign-off: SG
1	25.3	7.93			
2	25.3	NR			
4	25.3	7.74			
8	25.3	7.61			
Meter ID:	47	pH14			
Lab Water Control	24.6	9.91	9.71		Date: 1/15/10
0.5	24.6	9.40			WQ Time: 09:15
1	24.6	9.17			WQ Sign-off: HV
2	24.6	NR			
4	24.6	7.88			
8	24.6	7.59			
Meter ID:	47	pH09			
Lab Water Control	25.3	9.92	12.8	120	Date: 1/16/10
0.5	25.3	9.79	12.1	1190	Termination Time: 15:45
1	25.3	9.62	11.7	2041	Termination Sign-off: 82
2	25.3	8.71	9.4	3940	WQ Time: 12:03
4	25.3	7.63	8.7	7210	WQ Sign-off: NVS
8	25.3	7.48	8.6	13900	
Meter ID:	47	pH14	R003	EC03	

Initial Test Conditions				
Target: 16g NaCl in 2 L	Alkalinity	/	Hardness	Light Intensity (ftc)
Actual: 16.001	12	/	18	412

Appendix D

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Chevron/Cawelo “Inlet to Reservoir B” Effluent to *Ceriodaphnia dubia*

CETIS Summary Report

Report Date: 28 Jan-10 12:43 (p 1 of 2)
 Test Code: 21-3957-9223/37313

Ceriodaphnia Survival and Reproduction Test							Pacific EcoRisk				
Batch ID:	16-3500-2465	Test Type:	Reproduction-Survival (7d)	Analyst:	Jason Walker						
Start Date:	12 Jan-10 11:30	Protocol:	EPA-821-R-02-013 (2002)	Diluent:	Laboratory Water						
Ending Date:	18 Jan-10 18:30	Species:	Ceriodaphnia dubia	Brine:	Not Applicable						
Duration:	6d 7h	Source:	In-House Culture	Age:	1						
Sample ID:	15-0104-2531	Code:	Eff	Client:	Precision Analytical						
Sample Date:	11 Jan-10 07:30	Material:	Effluent	Project:	15508						
Receive Date:	11 Jan-10 19:01	Source:	Precision Analytical								
Sample Age:	28h (1.1 °C)	Station:	Inlet Resv B								
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
15-7382-8545	Reproduction	75	100	86.6	23.4%	1.33	Steel Mano-One Rank Test				
01-4350-5769	Survival	100	>100	N/A	N/A	1	Fisher Exact/Bonferroni-Holm Test				
Point Estimate Summary											
Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method				
02-1382-0789	Reproduction	IC5	66	54.2	78	1.52	Linear Interpolation (ICPIN)				
		IC10	76.8	63.6	81.6	1.3					
		IC15	80.3	75.1	85.5	1.25					
		IC20	84	79.2	90	1.19					
		IC25	87.8	82.9	95.1	1.14					
		IC40	>100	N/A	N/A	<1					
		IC50	>100	N/A	N/A	<1					
Reproduction Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	10	28.2	26.7	29.7	21	33	0.724	3.97	14.1%	0.0%
12.5		10	32.1	27.6	36.6	1	47	2.18	12	37.3%	-13.8%
25		10	35.2	33.2	37.2	30	49	0.961	5.27	15.0%	-24.8%
50		10	34.4	32.8	36	30	44	0.78	4.27	12.4%	-22.0%
75		10	30.1	28.6	31.6	26	40	0.748	4.09	13.6%	-6.74%
100		10	19.6	17.7	21.5	13	30	0.948	5.19	26.5%	30.5%
Survival Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	10	1	1	1	1	1	0	0	0.0%	0.0%
12.5		10	0.9	0.782	1	0	1	0.0577	0.316	35.1%	10.0%
25		10	1	1	1	1	1	0	0	0.0%	0.0%
50		10	1	1	1	1	1	0	0	0.0%	0.0%
75		10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%

CETIS Summary Report

Report Date:

28 Jan-10 12:43 (p 2 of 2)

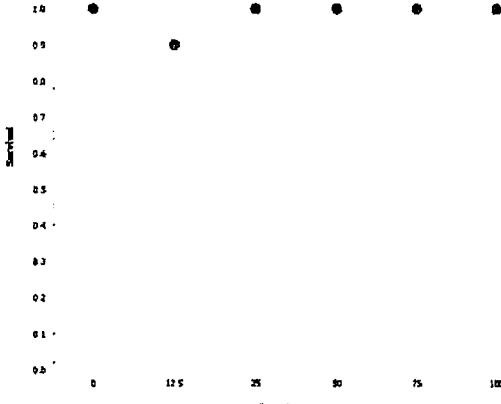
Test Code:

21-3957-9223/37313

Ceriodaphnia Survival and Reproduction Test											Pacific EcoRisk
Reproduction Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	30	33	31	27	31	21	23	26	28	32
12.5		1	36	38	36	35	29	34	35	30	47
25		33	37	34	35	32	30	32	34	36	49
50		31	34	30	38	34	30	32	36	35	44
75		28	30	30	26	26	31	29	28	33	40
100		18	15	22	13	15	18	25	22	18	30
Survival Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1	1	1	1	1	1	1	1	1	1
12.5		0	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
75		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

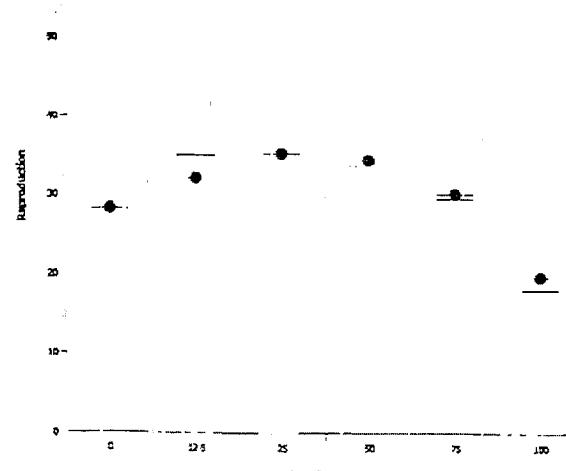
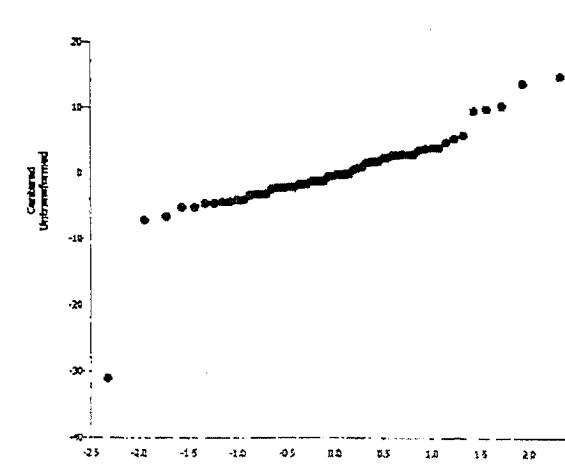
CETIS Analytical Report

Report Date: 28 Jan-10 12:43 (p 1 of 1)
Test Code: 21-3957-9223/37313

Ceriodaphnia Survival and Reproduction Test							Pacific EcoRisk			
Analysis ID:	01-4350-5769	Endpoint:	Survival				CETIS Version: CETISv1.7.0			
Analyzed:	28 Jan-10 12:41	Analysis:	STP 2x2 Contingency Tables				Official Results: Yes			
Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD		
Untransformed		C > T	Not Run	100	>100	N/A	1	N/A		
Fisher Exact/Bonferroni-Holm Test										
Control	vs	Conc-%	Test Stat	P-Value	Decision(0.05)					
Lab Water Control		12.5	0.5	1.0000	Non-Significant Effect					
		25	1	1.0000	Non-Significant Effect					
		50	1	1.0000	Non-Significant Effect					
		75	1	1.0000	Non-Significant Effect					
		100	1	1.0000	Non-Significant Effect					
Data Summary										
Conc-%	Control Type	No-Resp	Resp	Total						
0	Lab Water Cont	10	0	10						
12.5		9	1	10						
25		10	0	10						
50		10	0	10						
75		10	0	10						
100		10	0	10						
Graphics										
										

CETIS Analytical Report

Report Date: 28 Jan-10 12:43 (p 1 of 1)
 Test Code: 21-3957-9223/37313

Ceriodaphnia Survival and Reproduction Test								Pacific EcoRisk			
Analysis ID: 15-7382-8545 Analyzed: 28 Jan-10 12:42				Endpoint: Reproduction Analysis: Nonparametric-Control vs Treatments		CETIS Version: CETISv1.7.0 Official Results: Yes					
Data Transform		Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD		
Untransformed		0	C > T	Not Run	75	100	86.6	1.33	23.4%		
Steel Many-One Rank Test											
Control	vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)				
Lab Water Control		12.5	136	75	1	0.9999	Non-Significant Effect				
		25	147	75	3	1.0000	Non-Significant Effect				
		50	142	75	3	1.0000	Non-Significant Effect				
		75	112	75	5	0.9403	Non-Significant Effect				
		100 ^a	64.5	75	1	0.0050	Significant Effect				
ANOVA Table											
Source	Sum Squares		Mean Square	DF	F Stat	P-Value	Decision(5%)				
Between	1621.933		324.3867	5	7.83	<0.0001	Significant Effect				
Error	2237.8		41.44074	54							
Total	3859.733		365.8274	59							
ANOVA Assumptions											
Attribute	Test		Test Stat	Critical	P-Value	Decision(1%)					
Variances	Bartlett Equality of Variance		19.7	15.1	0.0014	Unequal Variances					
Distribution	Shapiro-Wilk Normality		0.82		<0.0001	Non-normal Distribution					
Reproduction Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	10	28.2	26.7	29.7	21	33	0.737	3.97	14.1%	0.0%
12.5		10	32.1	27.5	36.7	1	47	2.22	12	37.3%	-13.8%
25		10	35.2	33.2	37.2	30	49	0.978	5.27	15.0%	-24.8%
50		10	34.4	32.8	36	30	44	0.794	4.27	12.4%	-22.0%
75		10	30.1	28.5	31.7	26	40	0.76	4.09	13.6%	-6.74%
100		10	19.6	17.6	21.6	13	30	0.964	5.19	26.5%	30.5%
Graphics											
 											

CETIS Analytical Report

Report Date: 28 Jan-10 12:43 (p 1 of 1)
 Test Code: 21-3957-9223/37313

Ceriodaphnia Survival and Reproduction Test						Pacific EcoRisk
Analysis ID: 02-1382-0789 Analyzed: 28 Jan-10 12:42			Endpoint: Reproduction Analysis: Linear Interpolation (ICPIN)	CETIS Version: CETISv1.7.0 Official Results: Yes		
Linear Interpolation Options						
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method	
Log(X+1)	Linear	57951	200	Yes	Two-Point Interpolation	
Point Estimates						
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	66	54.2	78	1.52	1.28	1.84
IC10	76.8	63.6	81.6	1.3	1.23	1.57
IC15	80.3	75.1	85.5	1.25	1.17	1.33
IC20	84	79.2	90	1.19	1.11	1.26
IC25	87.8	82.9	95.1	1.14	1.05	1.21
IC40	>100	N/A	N/A	<1	N/A	N/A
IC50	>100	N/A	N/A	<1	N/A	N/A
Reproduction Summary						
Conc-%		Control Type	Count	Mean	Min	Max
0	Lab Water Contr		10	28.2	21	33
12.5			10	32.1	1	47
25			10	35.2	30	49
50			10	34.4	30	44
75			10	30.1	26	40
100			10	19.6	13	30
Calculated Variate						
Conc-%	Control Type	Count	Mean	Min	Max	Std Err
0	Lab Water Contr		10	28.2	21	0.724
12.5			10	32.1	1	2.18
25			10	35.2	30	0.961
50			10	34.4	30	0.78
75			10	30.1	26	0.748
100			10	19.6	13	0.948
CV%						
0	Lab Water Contr		10	28.2	21	3.97
12.5			10	32.1	1	12
25			10	35.2	30	5.27
50			10	34.4	30	4.27
75			10	30.1	26	4.09
100			10	19.6	13	5.19
Diff%						
0	Lab Water Contr		10	28.2	21	0.0%
12.5			10	32.1	1	-13.8%
25			10	35.2	30	-24.8%
50			10	34.4	30	-22.0%
75			10	30.1	26	-6.74%
100			10	19.6	13	26.5%
Reproduction Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Control		30	33	31	27
12.5			1	36	38	36
25			33	37	34	35
50			31	34	30	38
75			28	30	30	26
100			18	15	22	13
Rep 6	Rep 7	Rep 8	Rep 9	Rep 10		
21	23	26	28	32		
29	34	35	30	47		
32	30	36	36	49		
30	32	36	35	44		
31	29	28	33	40		
15	18	25	22	30		
Graphics						

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: P. Analytical - Chevron Cawelo

Material: Inlet to Res B

Test Date: 1/12/10

Project #: 15508 Test ID: 37313

Control Water: C. 0.5

Lab Water (80:20)

Survival / Reproduction												SIGN-OFF			
Day	pH	D.O.	Cond. ($\mu\text{S}/\text{cm}$)	Temp (°C)	A	B	C	D	E	F	G	H	I	J	
0	7.916	Old: 9.3 New: 9.3	224	25.5	0	0	0	0	0	0	0	0	0	0	
1	7.908.23	Old: 9.1 New: 9.0	224	25.2	0	0	0	0	0	0	0	0	0	0	
2	7.916 8.31	Old: 9.0 New: 8.40	224	25.5	0	0	0	0	0	0	0	0	0	0	
3	7.95	Old: 9.5 New: 8.4	217	24.9	5	0	6	5	5	4	4	3	6	6	
4	8.00	Old: 9.4 New: 8.17	220	26.0	0	8	0	0	6	0	8	0	0	0	
5	7.94	Old: 9.1 New: 8.32	214	25.1	12	10	8	11	9	14	10	11	11	11	
6	8.08	Old: 9.0 New: 8.92	217	251	17	19	16	14	15	12	15	15	15	15	
7															
8															
		Total =	30	33	31	27	31	21	23	26	28	32	32	32	
Day	pH	D.O.	Cond. ($\mu\text{S}/\text{cm}$)	Temp (°C)	A	B	C	D	E	F	G	H	I	J	SAMPLE ID
0	7.14	Old: 9.3 New: 9.3	302	0	0	0	0	0	0	0	0	0	0	0	23374
1	7.84 8.34	Old: 9.1 New: 8.9	304	0	0	0	0	0	0	0	0	0	0	0	23374
2	7.78	Old: 9.4 New: 8.36	301	0	0	0	0	0	0	0	0	0	0	0	23374
3	7.81	Old: 9.4 New: 8.41	293	11	0	4	0	3	4	5	0	0	0	0	23374
.4	7.57	Old: 9.2 New: 8.20	304	-	7	0	0	5	0	0	0	0	0	0	23374
5	2.60	Old: 9.0 New: 8.47	293	-	11	13	10	11	13	13	16	16	16	16	23374
6	7.92	Old: 9.0 New: 8.85	296	-	14	10	10	15	17	17	17	17	17	17	
7															
8															
		Total =	Y1	36	38	36	35	2A	34	35	36	47	47	47	Mean Neonates/Female = 32.1

All brood

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: P. Analytical - Chevron Cawelo

Material:

Test Date: 1/12/10

Project #: 15508 Test ID: 37313

Inlet to Res B

Control Water: Lab Water (80:20)

Day	pH	D.O.	Cond. (µS/cm)	Survival / Reproduction								SIGN-OFF	
				A	B	C	D	E	F	G	H		
0	7.46	9.3	379	0	0	0	0	0	0	0	0	0	
1	7.69	8.43	9.1	7.3	379	0	0	0	0	0	0	0	
2	7.49	8.42	8.7	8.4	389	0	0	0	0	0	0	0	
3	7.80	8.40	9.4	8.3	383	5	0	5	6	6	0	1	
4	7.34	8.26	9.0	8.3	375	0	7	0	0	0	7	0	
5	7.32	8.52	9.0	9.1	370	11	12	10	12	8	9	11	
6	7.46	8.80	8.8	8.9	358	17	18	19	17	15	16	18	
7													
8													
				Total =	33	37	34	35	32	30	32	34	36 Mean Neonates/Female = 35.2
Day	pH	D.O.	Cond. (µS/cm)	Survival / Reproduction								SIGN-OFF	
				A	B	C	D	E	F	G	H		
0	7.21	9.4	535	0	0	0	0	0	0	0	0	0	
1	7.40	8.55	9.2	7.3	532	0	0	0	0	0	0	0	
2	7.38	8.50	9.8	8.4	539	0	0	0	0	0	0	0	
3	7.16	8.55	9.3	9.3	573	6	0	6	2	4	6	9	
4	7.14	8.35	8.9	8.2	522	0	7	0	0	0	0	0	
5	2.08	8.45	8.2	9.2	520	10	11	9	13	15	10	16	
6	7.08	8.56	8.8	8.8	520	15	16	15	17	15	17	20	
7													
8													
				Total =	31	34	30	38	34	30	32	36	35 AA Mean Neonates/Female = 34.4

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: P. Analytical - Chevron Cawelo

Project #: 15508

Test ID: 37313

Material: Inlet to Res B

Randomization: C₂, C, S

Test Date: 1/12/10

Control Water: Lab Water (80:20)

Day	pH	D.O.	Cond. (µS/cm)	Survival / Reproduction												SIGN-OFF	
				New	Old	New	Old	A	B	C	D	E	F	G	H	I	
0	7.07	9.1	756	0	0	0	0	0	0	0	0	0	0	0	0	0	
1	7.30	8.68	9.5	7.3	6.69	0	0	0	0	0	0	0	0	0	0	0	
2	7.24	8.58	8.7	8.4	6.69	0	0	0	0	0	0	0	0	0	0	0	
3	7.13	8.58	9.2	8.4	6.55	6	0	0	0	0	0	0	0	0	0	0	
4	7.00	8.45	8.7	8.0	6.70	0	6	6	5	5	0	0	6	0	0	0	
5	6.94	8.40	8.9	9.2	6.63	6	11	9	8	8	9	10	14	12	12	12	
6	7.05	8.65	8.4	8.4	6.65	14	15	13	13	17	15	12	14	20	20	20	
7																	
8																	
				Total=	28	30	30	26	26	31	29	28	33	40	Mean Neonates/Female = 30.1		
Day	pH	D.O.	Cond. (µS/cm)	Survival / Reproduction												SIGN-OFF	
				New	Old	New	Old	A	B	C	D	E	F	G	H	I	
0	7.03	9.2	817	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	7.24	8.73	9.6	7.4	8.13	0	0	0	0	0	0	0	0	0	0	0	0
2	7.18	8.64	8.6	8.5	815	0	0	0	0	0	0	0	0	0	0	0	0
3	7.05	8.59	9.3	8.2	7.93	6	0	0	0	1	0	0	0	0	0	0	0
4	6.90	8.59	8.5	8.0	817	0	0	0	0	0	6	3	0	4	5	0	0
5	6.84	8.70	8.7	9.0	813	0	0	0	0	0	0	4	7	8	4	8	8
6	6.91	8.69	8.5	8.4	7.99	12	9	11	8	11	12	10	12	16	16	16	16
7																	
8				Total=	18	15	22	13	15	18	25	22	18	30	Mean Neonates/Female = 19.6		

Appendix E

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Ceriodaphnia dubia*

CETIS Summary Report

Report Date: 28 Jan-10 15:14 (p 1 of 2)
 Test Code: 06-8303-7391/37343

Ceriodaphnia Survival and Reproduction Test							Pacific EcoRisk				
Batch ID:	07-7625-6319	Test Type:	Reproduction-Survival (7d)		Analyst:	Jason Walker					
Start Date:	12 Jan-10 15:15	Protocol:	EPA-821-R-02-013 (2002)		Diluent:	Laboratory Water					
Ending Date:	18 Jan-10 17:30	Species:	Ceriodaphnia dubia		Brine:	Not Applicable					
Duration:	6d 2h	Source:	In-House Culture		Age:	1					
Sample ID:	14-1847-9695	Code:	NaCl		Client:	Reference Toxicant					
Sample Date:	12 Jan-10 15:15	Material:	Sodium chloride		Project:	15611					
Receive Date:	12 Jan-10 15:15	Source:	Reference Toxicant								
Sample Age:	N/A (25.1 °C)	Station:	In House								
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
19-8117-9498	Reproduction	500	1000	707	24.7%	Steel Many-One Rank Test					
01-1526-4136	Survival	1500	2000	1730	N/A	Fisher Exact/Bonferroni-Holm Test					
Point Estimate Summary											
Analysis ID	Endpoint	Level	g/L	95% LCL	95% UCL	TU	Method				
14-9958-8869	Reproduction	IC5	9.67	1.29	629	Linear Interpolation (ICPIN)					
		IC10	113	4.26	906						
		IC15	527	11.1	1040						
		IC20	608	26.6	1080						
		IC25	701	62.4	1130						
		IC40	1040	566	1310						
		IC50	1190	872	1430						
20-2422-2118	Survival	EC50	1730	1580	1900	Binomial/Graphical					
Reproduction Summary											
Conc-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	10	25.9	22.7	29.1	14	38	1.58	8.63	33.3%	0.0%
500		10	22.5	19.1	25.9	13	35	1.66	9.07	40.3%	13.1%
1000		10	16.2	13.2	19.2	6	29	1.45	7.96	49.1%	37.5%
1500		10	8.8	7.38	10.2	0	13	0.693	3.79	43.1%	66.0%
2000		10	0	0	0	0	0	0	0		100.0%
2500		10	0	0	0	0	0	0	0		100.0%
Survival Summary											
Conc-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	10	1	1	1	1	1	0	0	0.0%	0.0%
500		10	1	1	1	1	1	0	0	0.0%	0.0%
1000		10	1	1	1	1	1	0	0	0.0%	0.0%
1500		10	1	1	1	1	1	0	0	0.0%	0.0%
2000		10	0	0	0	0	0	0	0		100.0%
2500		10	0	0	0	0	0	0	0		100.0%

CETIS Summary Report

Report Date: 28 Jan-10 15:14 (p 2 of 2)
 Test Code: 06-8303-7391/37343

Ceriodaphnia Survival and Reproduction Test											Pacific EcoRisk
Reproduction Detail											
Conc-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	28	16	32	29	33	20	38	16	33	14
500		35	13	35	16	17	32	29	17	17	14
1000		27	23	14	19	8	14	29	11	11	6
1500		8	7	10	13	13	9	8	8	12	0
2000		0	0	0	0	0	0	0	0	0	0
2500		0	0	0	0	0	0	0	0	0	0
Survival Detail											
Conc-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1	1	1	1	1	1	1	1	1	1
500		1	1	1	1	1	1	1	1	1	1
1000		1	1	1	1	1	1	1	1	1	1
1500		1	1	1	1	1	1	1	1	1	1
2000		0	0	0	0	0	0	0	0	0	0
2500		0	0	0	0	0	0	0	0	0	0

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: _____

Reference Toxicant

Project #: 15611 Test ID: 37343

Test Date: 1/2/00

Material: Sodium Chloride

Project #: 15611 Test ID: 37343 Randomization: Board 5

Test Date: 1/2/00

Control Water: Lab Water (80:20)

Survival / Reproduction												SIGN-OFF		
Day	pH	D.O.	Cond. (μ S/cm)	Temp (°C)	A	B	C	D	E	F	G	H	I	J
0	8.03	9.1	22.2	25.1	0	0	0	0	0	0	0	0	0	0
1	8.17	8.23	9.5	8.7	25.4	0	0	0	0	0	0	0	0	0
2	7.99	8.20	9.7	8.7	22.7	25.6	0	0	0	0	0	0	0	0
3	8.11	8.26	9.3	8.0	2.29	24.9	0	0	0	0	0	0	0	0
4	8.10	8.02	8.9	8.5	20.3	25.0	0	4	7	5	6	7	4	4
5	8.05	8.44	9.1	8.4	23.6	25.1	10	12	10	10	12	13	11	12
6	8.12	8.30	9.1	8.5	21.4	25.1	12	0	15	14	15	0	10	10
7														
8														
					Total=	28	16	32	29	33	20	38	16	33
Survival / Reproduction												RT BATCH NUMBER		
Day	pH	D.O.	Cond. (μ S/cm)	A	B	C	D	E	F	G	H	I	J	
0	8.02	9.0	1347	0	0	0	0	0	0	0	0	0	0	
1	8.13	8.20	9.0	8.5	1243	0	0	0	0	0	0	0	0	0
2	9.09	8.21	9.6	8.8	1295	0	0	0	0	0	0	0	0	0
3	8.08	8.24	9.4	7.8	1248	0	0	0	0	0	0	0	0	0
4	8.01	7.95	8.9	8.0	1251	6	4	5	5	6	5	5	6	4
5	8.13	8.31	9.1	8.5	1175	13	9	12	11	11	12	11	10	12
6	8.07	6.44	9.1	8.5	1225	16	0	17	0	15	17	0	0	0
7														
8														
					Total=	35	13	33	16	17	32	29	17	17

500 mg/L

Mean Neonates/Female = 22.5

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client:		Reference Toxicant		Test ID:		Material:		Sodium Chloride		Test Date:		1/12/10					
Project #:		15611		37343		Randomization:		Round 5		Control Water:		Lab Water (80:20)					
Day	pH New	D.O. Old	D.O. New	Old	Cond. (μ S/cm)	Temp (°C)	Survival / Reproduction						SIGN-OFF				
							A	B	C	D	E	F	G	H	I	J	
0	8.03		9.1		2240	2100	0	0	0	0	0	0	0	0	0	0	
1	7.08	8.13	8.9	8.6			0	0	0	0	0	0	0	0	0	0	
2	8.10	8.20	9.7	9.3	2221	2100	0	0	0	0	0	0	0	0	0	0	
3	8.09	8.24	9.8	7.8	2187	2100	0	0	0	0	0	0	0	0	0	0	
4	8.00	7.96	8.8	7.9	2114	2100	5	4	5	4	2	2	5	4	4	0	
5	8.11	8.42	9.4	8.5	2173	2100	10	9	9	7	4	8	10	7	7	0	
6	8.09	8.40	9.1	8.4	2125	2100	12	10	0	8	0	0	14	0	0	0	
7																	
8																	
							Total =	27	22	14	19	8	14	29	11	11	
Day		pH	D.O.	D.O.	Cond.		Survival / Reproduction						SIGN-OFF				
New	Old	New	Old	Old	(μ S/cm)		A	B	C	D	E	F	G	H	I	J	
0	8.01		9.2		3030		0	0	0	0	0	0	0	0	0	0	
1	8.02	8.23	9.1	8.7	3120		0	0	0	0	0	0	0	0	0	0	
2	8.08	8.19	9.9	8.3	3160		0	0	0	0	0	0	0	0	0	0	
3	8.08	8.20	9.8	7.8	3190		0	0	0	0	0	0	0	0	0	0	
4	8.21	7.92	8.8	8.0	3170		0	3	4	0	2	3	2	3	0	0	
5	8.11	8.34	9.6	8.5	3090		8	4	6	3	4	6	4	5	5	0	
6	8.04	8.38	9.3	8.7	3150		0	0	0	10	5	0	0	1	0	0	
7																	
8																	
							Total =	8	7	10	13	13	9	8	9	12	0
Mean Neonates/Female = 8.8																	

Short-Term Chronic 3-Brood Ceriodaphnia dubia Survival & Reproduction Test Data

Client: 15611 Reference Toxicant: Test ID: 37343
 Project #: 2000 mg/L

Material: Sodium Chloride Randomization: Round 5
 Test Date: 4/12/16 Control Water: Lab Water (80:20)

	Day	D.O.			Cond. ($\mu\text{S}/\text{cm}$)	Temp ($^{\circ}\text{C}$)	Survival / Reproduction							SIGN-OFF	
		New	Old	New			A	B	C	D	E	F	G	H	
	0	7.78	7.4	4030	0	0	0	0	0	0	0	0	0	0	
1	8.00	8.21	9.3	8.8	4030	0	0	0	0	0	0	0	0	0	
2	8.07	8.18	10.0	8.3	4080	1/0	0	0	0	0	0	0	0	0	
3	8.09	8.23	10.0	8.0	4060	-	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	
4	8.90	-	8.8	-	3980	-	-	-	-	-	-	-	-	-	
5	8.06	-	9.8	-	3930	-	-	-	-	-	-	-	-	-	
6						-	-	-	-	-	-	-	-	-	
7						-	-	-	-	-	-	-	-	-	
8						-	-	-	-	-	-	-	-	-	
	Total=					1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	Mean Neonatus/Female = 0
	Day	D.O.			Cond. ($\mu\text{S}/\text{cm}$)	Temp ($^{\circ}\text{C}$)	Survival / Reproduction							SIGN-OFF	
		pH	New	Old	A	B	C	D	E	F	G	H			
	0	7.95	9.5	5030	0	0	0	0	0	0	0	0	0	0	
1	8.00	8.19	9.4	8.8	4990	1/0	0	0	0	0	0	0	0	0	
2	8.06	8.17	10.0	8.4	4940	-	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
5	8.03	-	10.1	-	4840	-	-	-	-	-	-	-	-	-	
6						-	-	-	-	-	-	-	-	-	
7						-	-	-	-	-	-	-	-	-	
8						-	-	-	-	-	-	-	-	-	
	Total=					1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	Mean Neonatus/Female = 0

Appendix F

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Chevron/Cawelo “Inlet to Reservoir B” Effluent to Fathead Minnows

CETIS Summary Report

Report Date: 28 Jan-10 11:54 (p 1 of 2)
 Test Code: 05-4842-7016/37318

Chronic Larval Fish Survival and Growth Test							Pacific EcoRisk
Batch ID:	18-8393-8665	Test Type:	Growth-Survival (7d)	Analyst:	Jason Walker		
Start Date:	12 Jan-10 13:00	Protocol:	EPA-821-R-02-013 (2002)	Diluent:	Laboratory Water		
Ending Date:	19 Jan-10 09:45	Species:	Pimephales promelas	Brine:	Not Applicable		
Duration:	6d 21h	Source:	Chesapeake Cultures, Inc.	Age:	1		
Sample ID:	15-0104-2531	Code:	Eff	Client:	Precision Analytical		
Sample Date:	11 Jan-10 07:30	Material:	Effluent	Project:	15508		
Receive Date:	11 Jan-10 19:01	Source:	Precision Analytical				
Sample Age:	29h (1.1 °C)	Station:	Inlet Resv B				
Comparison Summary							
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
18-6678-5332	7d Survival Rate	25	50	35.4	20.5%	4	Dunnett's Multiple Comparison Test
01-0098-3316	Mean Dry Biomass-mg	12.5	25	17.7	16.0%	8	Steel Manv-One Rank Test
11-6682-6078	Mean Dry Weight-mg	12.5	25	17.7	13.8%	8	Dunnett's Multiple Comparison Test
Point Estimate Summary							
Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
07-0464-0753	7d Survival Rate	EC5	20.7	14.7	24.9	4.84	Linear Regression (MLE)
		EC10	22.9	17.1	27.1	4.36	
		EC15	24.6	18.9	28.8	4.06	
		EC20	26	20.5	30.2	3.84	
		EC25	27.3	21.9	31.4	3.66	
		EC40	30.9	25.8	35.1	3.24	
		EC50	33.2	28.3	37.7	3.01	
02-4213-8276	Mean Dry Biomass-mg	IC5	13.3	N/A	14.5	7.5	Linear Interpolation (ICPIN)
		IC10	14.7	N/A	16.4	6.81	
		IC15	16.2	2.51	18.5	6.19	
		IC20	17.8	10.4	20.9	5.62	
		IC25	19.6	12.4	23.6	5.11	
		IC40	25.6	19.6	29	3.9	
		IC50	28.8	24.7	32.2	3.47	
7d Survival Rate Summary							
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max
0	Lab Water Contr	4	0.9	0.825	0.975	0.6	1
12.5		4	0.9	0.87	0.93	0.8	1
25		4	0.75	0.702	0.798	0.6	0.9
50		4	0.075	0.019	0.131	0	0.3
75		4	0	0	0	0	0
100		4	0	0	0	0	0
Mean Dry Biomass-mg Summary							
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max
0	Lab Water Contr	4	0.306	0.283	0.329	0.217	0.36
12.5		4	0.3	0.29	0.311	0.262	0.325
25		4	0.19	0.186	0.194	0.174	0.199
50		4	0.00775	0.00196	0.0135	0	0.031
75		4	0	0	0	0	0
100		4	0	0	0	0	0

CETIS Summary Report

Report Date: 28 Jan-10 11:54 (p 2 of 2)
 Test Code: 05-4842-7016/37318

Chronic Larval Fish Survival and Growth Test											Pacific EcoRisk
Mean Dry Weight-mg Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.342	0.334	0.35	0.318	0.362	0.00406	0.0222	6.5%	0.0%
12.5		4	0.334	0.329	0.339	0.325	0.353	0.00239	0.0131	3.92%	2.33%
25		4	0.257	0.244	0.271	0.211	0.29	0.00649	0.0355	13.8%	24.7%
50		4	0.0258	0.00654	0.0451	0	0.103	0.00943	0.0517	200.0%	92.4%
75		4	0	0	0	0	0	0	0		100.0%
100		4	0	0	0	0	0	0	0		100.0%
7d Survival Rate Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Lab Water Contr	1	1	1	0.6						
12.5		0.8	0.9	0.9	1						
25		0.7	0.8	0.6	0.9						
50		0	0.3	0	0						
75		0	0	0	0						
100		0	0	0	0						
Mean Dry Biomass-mg Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Lab Water Contr	0.36	0.318	0.328	0.217						
12.5		0.262	0.297	0.318	0.325						
25		0.196	0.199	0.174	0.19						
50		0	0.031	0	0						
75		0	0	0	0						
100		0	0	0	0						
Mean Dry Weight-mg Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Lab Water Contr	0.36	0.318	0.328	0.362						
12.5		0.327	0.33	0.353	0.325						
25		0.28	0.249	0.29	0.211						
50		0	0.103	0	0						
75		0	0	0	0						
100		0	0	0	0						

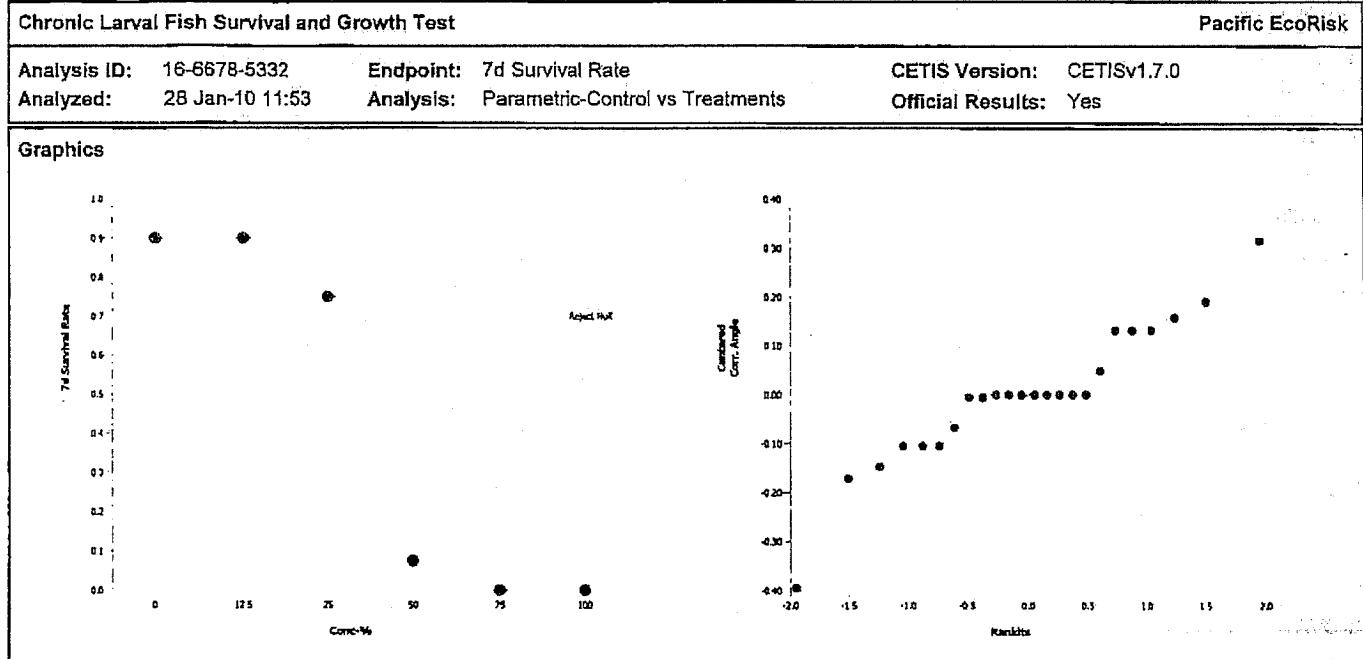
CETIS Analytical Report

Report Date: 28 Jan-10 11:54 (p 3 of 4)
 Test Code: 05-4842-7016/37318

Chronic Larval Fish Survival and Growth Test							Pacific EcoRisk				
Analysis ID: 16-6678-5332	Endpoint: 7d Survival Rate				CETIS Version:	CETISv1.7.0					
Analyzed: 28 Jan-10 11:53	Analysis: Parametric-Control vs Treatments				Official Results:	Yes					
Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD			
Angular (Corrected)	0	C > T	Not Run	25	50	35.4	4	20.5%			
Dunnett's Multiple Comparison Test											
Control	vs	Conc-%	Test Stat	Critical	MSD	P-Value	Decision(5%)				
Lab Water Control	12.5	0.232	2.41	0.272	0.7561	Non-Significant Effect					
	25	1.97	2.41	0.272	0.1105	Non-Significant Effect					
	50*	8.99	2.41	0.272	<0.0001	Significant Effect					
	75*	9.93	2.41	0.272	<0.0001	Significant Effect					
	100*	9.93	2.41	0.272	<0.0001	Significant Effect					
ANOVA Table											
Source	Sum Squares		Mean Square	DF	F Stat	P-Value	Decision(5%)				
Between	6.194129		1.238826	5	48.5	<0.0001	Significant Effect				
Error	0.4598231		0.02554573	18							
Total	6.653953		1.264372	23							
ANOVA Assumptions											
Attribute	Test		Test Stat	Critical	P-Value	Decision(1%)					
Variances	Mod Levene Equality of Variance		0.656	4.25	0.6608	Equal Variances					
Distribution	Shapiro-Wilk Normality		0.929		0.0950	Normal Distribution					
7d Survival Rate Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.9	0.824	0.976	0.6	1	0.0371	0.2	22.2%	0.0%
12.5		4	0.9	0.869	0.931	0.8	1	0.0152	0.0816	9.07%	0.0%
25		4	0.75	0.701	0.799	0.6	0.9	0.024	0.129	17.2%	16.7%
50		4	0.075	0.0179	0.132	0	0.3	0.0279	0.15	200.0%	91.7%
75		4	0	0	0	0	0	0	0		100.0%
100		4	0	0	0	0	0	0	0		100.0%
Angular (Corrected) Transformed Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Cont	4	1.28	1.18	1.38	0.886	1.41	0.0488	0.263	20.5%	0.0%
12.5		4	1.25	1.21	1.3	1.11	1.41	0.0231	0.125	9.93%	2.05%
25		4	1.06	0.999	1.12	0.886	1.25	0.029	0.156	14.7%	17.4%
50		4	0.264	0.184	0.344	0.159	0.58	0.0391	0.21	79.7%	79.4%
75		4	0.159	0.159	0.159	0.159	0.159	0	0	0.0%	87.6%
100		4	0.159	0.159	0.159	0.159	0.159	0	0	0.0%	87.6%

CETIS Analytical Report

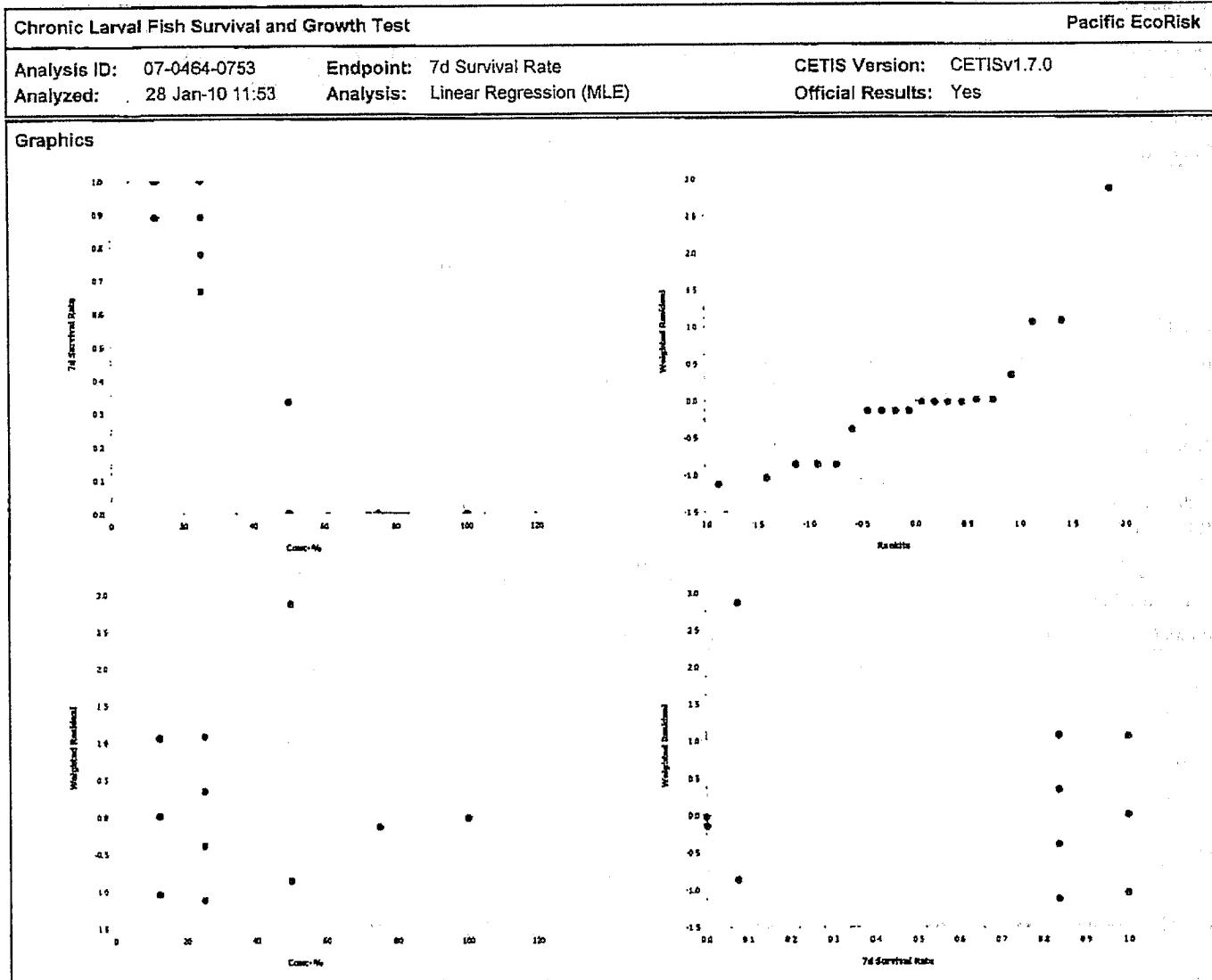
Report Date: 28 Jan-10 11:54 (p 4 of 4)
Test Code: 05-4842-7016/37318



CETIS Analytical Report

Report Date: 28 Jan-10 11:54 (p 1 of 2)
 Test Code: 05-4842-7016/37318

Chronic Larval Fish Survival and Growth Test									Pacific EcoRisk										
Analysis ID: 07-0464-0753 Analyzed: 28 Jan-10 11:53	Endpoint: 7d Survival Rate Analysis: Linear Regression (MLE)						CETIS Version: CETISv1.7.0 Official Results: Yes												
Linear Regression Options																			
Model Function			Threshold Option	Threshold	Optimized	Pooled	Het Corr	Weighted											
Log-Normal [NED=A+B*log(X)]			Control Threshold	0.1	Yes	No	No	Yes											
Regression Summary																			
Iters	LL	AICc	Mu	Sigma	G Stat	Chi-Sq	Critical	P-Value	Decision(5%)										
9	-29.5	63.6	-0.896	0.125	0.113	14.3	28.9	0.7090	Non-Significant Heterogeneity										
Point Estimates																			
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL													
EC5	20.7	14.7	24.9	4.84	4.01	6.79													
EC10	22.9	17.1	27.1	4.36	3.69	5.84													
EC15	24.6	18.9	28.8	4.06	3.48	5.28													
EC20	26	20.5	30.2	3.84	3.32	4.88													
EC25	27.3	21.9	31.4	3.66	3.18	4.56													
EC40	30.9	25.8	35.1	3.24	2.85	3.88													
EC50	33.2	28.3	37.7	3.01	2.65	3.53													
Regression Parameters																			
Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(5%)												
Threshold	0.1	0.0337	0.0343	0.166	2.98	0.0081	Significant Parameter												
Slope	8	1.37	5.31	10.7	5.83	<0.0001	Significant Parameter												
Intercept	-7.16	2.15	-11.4	-2.94	-3.33	0.0037	Significant Parameter												
Residual Analysis																			
Attribute	Method			Test Stat	Critical	P-Value	Decision(5%)												
Variances	Mod Levene Equality of Variance			0.899	3.06	0.4892	Equal Variances												
Distribution	Shapiro-Wilk Normality			0.813		0.0014	Non-normal Distribution												
7d Survival Rate Summary																			
Calculated Variate(A/B)																			
Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Dif%	A	B								
0	Lab Water Contr	4	0.9	0.6	1	0.0365	0.2	22.2%	0.0%	36	40								
12.5		4	0.9	0.8	1	0.0149	0.0816	9.07%	0.0%	36	40								
25		4	0.75	0.6	0.9	0.0236	0.129	17.2%	16.7%	30	40								
50		4	0.075	0	0.3	0.0274	0.15	200.0%	91.7%	3	40								
75		4	0	0	0	0	0		100.0%	0	40								
100		4	0	0	0	0	0		100.0%	0	40								
7d Survival Rate Detail																			
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4														
0	Lab Water Control	1	1	1	0.6														
12.5		0.8	0.9	0.9	1														
25		0.7	0.8	0.6	0.9														
50		0	0.3	0	0														
75		0	0	0	0														
100		0	0	0	0														

CETIS Analytical ReportReport Date: 28 Jan-10 11:54 (p 2 of 2)
Test Code: 05-4842-7016/37318

CETIS Analytical Report

Report Date: 28 Jan-10 11:54 (p 2 of 4)
 Test Code: 05-4842-7016/37318

Chronic Larval Fish Survival and Growth Test								Pacific EcoRisk				
Analysis ID: 01-0098-3316 Analyzed: 28 Jan-10 11:53	Endpoint: Mean Dry Biomass-mg Analysis: Nonparametric-Control vs Treatments				CETIS Version: CETISv1.7.0 Official Results: Yes							
Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD				
Untransformed	0	C > T	Not Run	12.5	25	17.7	8	16.0%				
Steel Many-One Rank Test												
Control	vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)					
Lab Water Control		12.5	15.5	10	1	0.5438	Non-Significant Effect					
		25*	10	10	0	0.0417	Significant Effect					
		50*	10	10	0	0.0417	Significant Effect					
		75*	10	10	0	0.0417	Significant Effect					
		100*	10	10	0	0.0417	Significant Effect					
ANOVA Table												
Source	Sum Squares		Mean Square	DF	F Stat	P-Value	Decision(5%)					
Between	0.4487169		0.08974338	5	108	<0.0001	Significant Effect					
Error	0.01495934		0.0008310743	18								
Total	0.4636762		0.09057445	23								
ANOVA Assumptions												
Attribute	Test		Test Stat	Critical	P-Value	Decision(1%)						
Variances	Mod Levene Equality of Variance		1.84	4.25	0.1547	Equal Variances						
Distribution	Shapiro-Wilk Normality		0.807		0.0004	Non-normal Distribution						
Mean Dry Biomass-mg Summary												
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%	
0	Lab Water Contr	4	0.306	0.282	0.329	0.217	0.36	0.0115	0.0618	20.2%	0.0%	
12.5		4	0.3	0.29	0.311	0.262	0.325	0.00525	0.0283	9.41%	1.72%	
25		4	0.19	0.186	0.194	0.174	0.199	0.00207	0.0111	5.87%	37.9%	
50		4	0.00775	0.00185	0.0136	0	0.031	0.00288	0.0155	200.0%	97.5%	
75		4	0	0	0	0	0	0	0		100.0%	
100		4	0	0	0	0	0	0	0		100.0%	
Graphics												

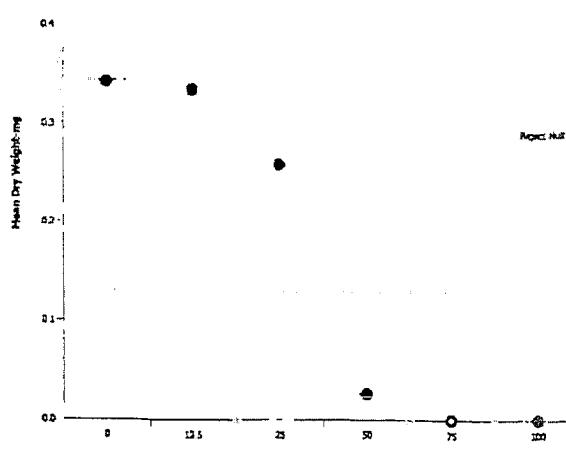
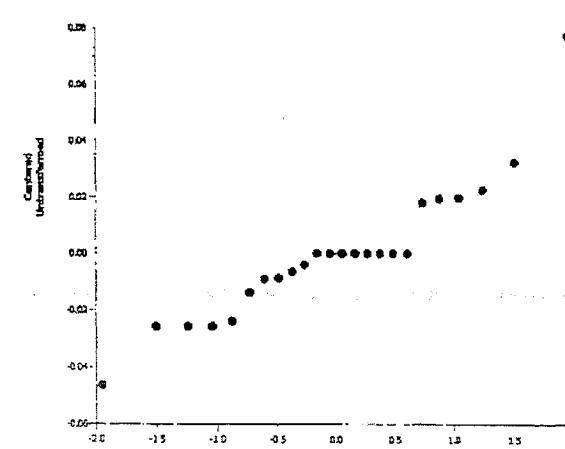
CETIS Analytical Report

Report Date: 28 Jan-10 11:54 (p 1 of 1)
 Test Code: 05-4842-7016/37318

Chronic Larval Fish Survival and Growth Test						Pacific EcoRisk
Analysis ID: 02-4213-8276 Analyzed: 28 Jan-10 11:53			Endpoint: Mean Dry Biomass-mg Analysis: Linear Interpolation (ICPIN)			CETIS Version: CETISv1.7.0 Official Results: Yes
Linear Interpolation Options						
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method	
Log(X+1)	Linear	57951	200	Yes	Two-Point Interpolation	
Point Estimates						
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	13.3	N/A	14.5	7.5	6.92	N/A
IC10	14.7	N/A	16.4	6.81	6.11	N/A
IC15	16.2	2.51	18.5	6.19	5.4	39.8
IC20	17.8	10.4	20.9	5.62	4.78	9.65
IC25	19.6	12.4	23.6	5.11	4.23	8.04
IC40	25.6	19.6	29	3.9	3.45	5.11
IC50	28.8	24.7	32.2	3.47	3.11	4.05
Mean Dry Biomass-mg Summary				Calculated Variate		
Conc-%	Control Type	Count	Mean	Min	Max	Std Err
0	Lab Water Contr	4	0.306	0.217	0.36	0.0113
12.5		4	0.3	0.262	0.325	0.00517
25		4	0.19	0.174	0.199	0.00204
50		4	0.00775	0	0.031	0.00283
75		4	0	0	0	0
100		4	0	0	0	0
Mean Dry Biomass-mg Detail						
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	
0	Lab Water Control	0.36	0.318	0.328	0.217	
12.5		0.262	0.297	0.318	0.325	
25		0.196	0.199	0.174	0.19	
50		0	0.031	0	0	
75		0	0	0	0	
100		0	0	0	0	
Graphics						

CETIS Analytical Report

Report Date: 28 Jan-10 11:54 (p 1 of 4)
 Test Code: 05-4842-7016/37318

Chronic Larval Fish Survival and Growth Test							Pacific EcoRisk				
Analysis ID: 11-6682-6078 Analyzed: 28 Jan-10 11:53	Endpoint: Mean Dry Weight-mg Analysis: Parametric-Control vs Treatments				CETIS Version: CETISv1.7.0 Official Results: Yes						
Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TU	PMSD				
Untransformed	0	C > T	Not Run	12.5	25	17.7	8 13.8%				
Dunnett's Multiple Comparison Test											
Control	vs	Conc-%	Test Stat	Critical	MSD	P-Value	Decision(5%)				
Lab Water Control		12.5	0.407	2.41	0.0471	0.6873	Non-Significant Effect				
		25*	4.31	2.41	0.0471	0.0009	Significant Effect				
		50*	16.1	2.41	0.0471	<0.0001	Significant Effect				
		75*	17.5	2.41	0.0471	<0.0001	Significant Effect				
		100*	17.5	2.41	0.0471	<0.0001	Significant Effect				
ANOVA Table											
Source	Sum Squares		Mean Square	DF	F Stat	P-Value	Decision(5%)				
Between	0.5682203		0.1136441	5	148	<0.0001	Significant Effect				
Error	0.01379516		0.0007663975	18							
Total	0.5820154		0.1144105	23							
ANOVA Assumptions											
Attribute	Test		Test Stat	Critical	P-Value	Decision(1%)					
Variances	Mod Levene Equality of Variance		1.19	4.25	0.3538	Equal Variances					
Distribution	Shapiro-Wilk Normality		0.896		0.0173	Normal Distribution					
Mean Dry Weight-mg Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.342	0.333	0.35	0.318	0.362	0.00413	0.0222	6.5%	0.0%
12.5		4	0.334	0.329	0.339	0.325	0.353	0.00243	0.0131	3.92%	2.33%
25		4	0.257	0.244	0.271	0.211	0.29	0.0066	0.0355	13.8%	24.7%
50		4	0.0258	0.00618	0.0455	0	0.103	0.00959	0.0517	200.0%	92.4%
75		4	0	0	0	0	0	0	0	0	100.0%
100		4	0	0	0	0	0	0	0	0	100.0%
Graphics											
											
											

7 Day Chronic Fathead Minnow Toxicity Test Data

Client: P. Analytical - Chevron Cawelo
 Test Material: Inlet to Res B
 Test ID#: 37318 Project #: 15508
 Test Date: 1-12-10 Randomization: 4-6-2

Organism Log#: 4993 Age: 248 hrs
 Organism Supplier: Chesapeake Cultures
 Control/Diluent: EPAMH
 Control Water Batch: 1275

Treatment (% Effluent)	Temp (°C)			D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms				SIGN-OFF
		new	old	new	old		A	B	C	D	
Lab Water Control	25.0	7.74		8.8		300	10	10	10	10	Date: 1-12-10
12.5%	25.0	7.26		8.3		363	10	10	10	10	Sample ID: 23374
25%	25.0	7.05		8.3		429	10	10	10	10	Test Solution Prep: AB
50%	25.0	6.93		8.1		557	10	10	10	10	New WQ: 0073
75%	25.0	6.78		7.7		681	10	10	10	10	Initiation Time: 1300
100%	25.0	6.70		6.8		806	10	10	10	10	Initiation Signoff: JPA
Meter ID	33A	pH14		RD02		E003					DATA
Lab Water Control	25.3	8.10	7.87	9.4	7.9	311	10	10	10	10	Date: 1-13-10
12.5%	25.3	7.85	7.82	9.3	7.9	367	10	10	10	10	Sample ID: 23374
25%	25.3	7.63	7.79	9.1	7.8	430	10	10	9	10	Test Solution Prep: JI
50%	25.3	7.34	7.84	9.0	7.8	559	10	10	10	10	New WQ: Son
75%	25.3	7.14	7.87	8.7	7.9	688	9	10	10	9	Renewal Time: 1315
100%	25.3	6.94	8.01	7.9	7.9	813	9	8	8	9	Renewal Signoff: JPA
Meter ID	33A	pH14	pH14	RD01	RD01	E005					Old WQ: Son
Lab Water Control	25.5	7.59	8.19	9.0	8.1	379	10	10	10	9	Date: 1/14/10
12.5%	25.5	7.54	8.17	9.0	7.9	372	10	10	9	10	Sample ID: 23374
25%	25.5	7.35	8.00	8.9	7.9	455	9	10	9	10	Test Solution Prep: JPA
50%	25.5	7.12	7.92	8.9	7.8	563	10	10	10	10	New WQ: JPA
75%	25.5	6.95	7.92	8.7	7.8	695	8	9	10	8	Renewal Time: 1400
100%	25.5	6.89	8.01	8.5	7.8	819	4	1	2	5	Renewal Signoff: JPA
Meter ID	33A	pH09	pH02	RD03	RD01	E003					Old WQ: JPA
Lab Water Control	25.3	8.22	7.89	9.1	7.7	307	10	10	10	9	Date: 1/15/10
12.5%	25.3	7.89	7.91	9.0	7.7	373	8	9	9	10	Sample ID: 23374
25%	25.3	7.61	7.91	8.9	7.8	438	8	10	9	10	Test Solution Prep: JPA
50%	25.3	7.13	8.03	8.9	7.8	557	10	10	9	10	New WQ: JPA
75%	25.3	7.02	8.04	8.9	7.6	694	7	8	9	7	Renewal Time: 1030
100%	25.3	6.92	8.01	8.7	6.5	832	0	1	1	4	Renewal Signoff: JPA
Meter ID	33A	pH14	pH02	RD01	RD03	E005					Old WQ: SG

7 Day Chronic Fathead Minnow Toxicity Test Data

Client: P. Analytical - Chevron Cawelo
 Test Material: Inlet to Res B
 Test ID#: 37318 Project #: 15508
 Test Date: 1-12-10 Randomization: 462
 Organism Log#: 4993 Age: 248 hrs
 Organism Supplier: Chesapeake Cultures
 Control/Diluent: EPAMH
 Control Water Batch: 1275

Treatment (% Effluent)	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms				SIGN-OFF
		new	old	new	old		A	B	C	D	
Lab Water Control	25.0	7.82	7.83	9.3	8.1	310	10	10	10	7	Date: 1/16/10 Sample ID: 23374 Test Solution Prep: SG New WQ: SC Renewal Time: 1145 Renewal Signoff: JT Old WQ: JP
12.5%	25.0	7.52	7.93	9.1	8.0	380	8	9	9	10	
25%	25.0	7.24	7.90	9.0	8.3	446	7	10	9	9	
50%	25.0	7.07	8.05	8.9	8.2	574	6	5	6	7	
75%	25.0	6.95	8.04	8.8	8.0	701	4	3	4	5	
100%	25.0	6.81	8.05	8.4	7.8	822	-	0	0	1	
Meter ID	33A	pH12	pH14	R001	R003	EC04					
Lab Water Control	25.3	8.02	8.10	9.3	7.3	311	10	10	10	7	Date: 1/17/10 Sample ID: 23374 Test Solution Prep: ST New WQ: SG Renewal Time: 1100 Renewal Signoff: JM Old WQ: SG
12.5%	25.3	7.656	8.04	7.92	9.0	384	8	9	9	10	
25%	25.3	7.46	7.84	8.9	7.0	435	7	9	9	9	
50%	25.3	7.17	7.84	9.1	7.0	556	4	4	3	2	
75%	25.3	7.04	7.75	9.1	6.9	683	0	0	0	0	
100%	25.3	6.92	7.70	8.9	7.1	809	-	-	-	0	
Meter ID	33A	pH14	pH14	R002	R002	EC05					
Lab Water Control	25.3	8.11	7.97	9.1	7.0	308	10	10	10	7	Date: 1/18/10 Sample ID: 23374 Test Solution Prep: ST New WQ: JL Renewal Time: 1300 Renewal Signoff: JM Old WQ: JL
12.5%	25.3	8.07	7.67	7.84	9.0	369	8	9	9	10	
25%	25.3	7.35	7.88	8.8	7.0	432	7	9	9	9	
50%	25.3	7.12	7.94	8.8	6.9	553	1	3	2	1	
75%	-	-	-	-	-	-	-	-	-	-	
100%	-	-	-	-	-	-	-	-	-	-	
Meter ID	33A	pH12	pH14	R001	R003	EC03					
Lab Water Control	25.6		8.11		8.2	314	10	10	10	6	Date: 1/19/10 Termination Time: 0945 Termination Signoff: JR Old WQ: JM
12.5%	25.6		8.08		8.4	378	8	9	9	10	
25%	25.6		8.13		8.4	445	7	8	6	9	
50%	25.6		8.17		8.4	572	0	3	0	0	
75%	-		-		-	-	-	-	-	-	
100%	-		-		-	-	-	-	-	-	
Meter ID	33A		pH12		R001	EC05					

Fathead Minnow Dry Weight Data Sheet

Client: P. Analytical - Chevron Cawelo Test ID #: 37318 Project # 15508
 Sample: Inlet to Res B Tare Weight Date: 1/16/10 Sign-off: KP
 Test Date: 1-12-10 Final Weight Date: 1/23/10 Sign-off: DS

Pan ID	Concentration Replicate	Initial Pan Weight (mg)	Final Pan Weight (mg)	Initial # of Organisms	Biomass Value (mg)
1	Lab Water A	156.79	160.39	10	0.360
2	B	183.05	186.23	10	0.318
3	C	159.17	162.45	10	0.328
4	D	159.56	161.73	10	0.217
5	125	160.80	163.42	10	0.262
6	B	176.71	179.68	10	0.297
7	C	180.69	183.87	10	0.318
8	D	174.88	178.13	10	0.325
9	25	178.45	180.41	10	0.196
10	B	181.75	183.74	10	0.249
11	C	188.26	190.00	10	0.174
12	D	160.99	162.89	10	0.190
13	50	189.13	—	10	—
14	B	159.36	159.67	10	0.031
15	C	188.58	—	10	—
16	D	161.61	—	10	—
17	75	159.04	—	10	—
18	B	164.16	—	10	—
19	C	174.99	—	10	—
20	D	177.86	—	10	—
21	100	196 176.91	—	10	—
22	B	158.06	—	10	—
23	C	162.35	—	10	—
24	D	181.94	—	10	—
QA 1		170.44	170.41		
QA 2		192.23	192.15		
Balance ID		1	1		

Appendix G

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the Fathead Minnows

CETIS Summary Report

Report Date: 01 Feb-10 18:25 (p 1 of 2)
 Test Code: 04-3902-0471/37373

Chronic Larval Fish Survival and Growth Test							Pacific EcoRisk				
Batch ID:	20-2507-7023	Test Type:	Growth-Survival (7d)	Analyst:	Patrick Anderson						
Start Date:	12 Jan-10 17:50	Protocol:	EPA-821-R-02-013 (2002)	Diluent:	Laboratory Water						
Ending Date:	19 Jan-10 11:25	Species:	Pimephales promelas	Brine:	Not Applicable						
Duration:	6d 18h	Source:	Chesapeake Cultures, Inc.	Age:	1						
Sample ID:	14-1847-9695	Code:	NaCl	Client:	Reference Toxicant						
Sample Date:	12 Jan-10 17:50	Material:	Sodium chloride	Project:	15610						
Receive Date:	12 Jan-10 17:50	Source:	Reference Toxicant								
Sample Age:	N/A (25.6 °C)	Station:	In House								
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
16-0774-6408	7d Survival Rate	1.5	3	2.12	25.3%		Steel Many-One Rank Test				
16-0932-2847	Mean Dry Biomass-mg	1.5	3	2.12	24.9%		Steel Many-One Rank Test				
11-5545-6448	Mean Dry Weight-mg	3	6	4.24	31.5%		Steel Many-One Rank Test				
Point Estimate Summary											
Analysis ID	Endpoint	Level	g/L	95% LCL	95% UCL	TU	Method				
02-4270-2364	7d Survival Rate	EC5	2.49	0.899	3.22		Linear Regression (MLE)				
		EC10	2.72	1.18	3.46						
		EC15	2.89	1.4	3.65						
		EC20	3.03	1.6	3.82						
		EC25	3.16	1.8	3.99						
		EC40	3.51	2.33	4.56						
		EC50	3.74	2.67	5.05						
00-6146-6034	Mean Dry Biomass-mg	IC5	0.796	N/A	2.14		Linear Interpolation (ICPIN)				
		IC10	1.03	0.0866	2.29						
		IC15	1.29	0.389	2.57						
		IC20	1.61	0.529	2.84						
		IC25	2.04	0.512	3.19						
		IC40	3.21	1.5	3.57						
		IC50	3.58	3.1	3.91						
7d Survival Rate Summary											
Conc-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.975	0.956	0.994	0.9	1	0.00913	0.05	5.13%	0.0%
0.75		4	0.925	0.906	0.944	0.9	1	0.00913	0.05	5.41%	5.13%
1.5		4	0.775	0.631	0.919	0.2	1	0.0705	0.366	49.8%	20.5%
3		4	0.725	0.669	0.781	0.5	0.8	0.0274	0.15	20.7%	25.6%
6		4	0.025	0.00633	0.0437	0	0.1	0.00913	0.05	200.0%	97.4%
9		4	0	0	0	0	0	0	0		100.0%
Mean Dry Biomass-mg Summary											
Conc-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.241	0.235	0.248	0.217	0.257	0.00316	0.0173	7.17%	0.0%
0.75		4	0.232	0.219	0.245	0.186	0.269	0.00643	0.0352	15.2%	3.94%
1.5		4	0.196	0.169	0.224	0.086	0.244	0.0135	0.0741	37.7%	18.5%
3		4	0.159	0.152	0.167	0.13	0.178	0.00378	0.0207	13.0%	34.0%
6		4	0	0	0	0	0	0	0		100.0%
9		4	0	0	0	0	0	0	0		100.0%

CETIS Summary Report

Report Date: 01 Feb-10 18:25 (p 2 of 2)
 Test Code: 04-3902-0471/37373

Chronic Larval Fish Survival and Growth Test											Pacific EcoRisk
Mean Dry Weight-mg Summary											
Conc-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.248	0.238	0.258	0.217	0.277	0.00459	0.0252	10.1%	0.0%
0.75		4	0.252	0.234	0.27	0.186	0.299	0.00883	0.0483	19.2%	-1.68%
1.5		4	0.289	0.253	0.324	0.227	0.43	0.0173	0.0948	32.8%	-16.4%
3		4	0.223	0.214	0.233	0.201	0.26	0.00473	0.0259	11.6%	9.96%
6		4	0	0	0	0	0	0	0		100.0%
9		4	0	0	0	0	0	0	0		100.0%
7d Survival Rate Detail											
Conc-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Lab Water Contr	1	1	0.9	1						
0.75		0.9	0.9	0.9	1						
1.5		0.2	1	1	0.9						
3		0.5	0.8	0.8	0.8						
6		0	0	0.1	0						
9		0	0	0	0						
Mean Dry Biomass-mg Detail											
Conc-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Lab Water Contr	0.217	0.257	0.249	0.242						
0.75		0.226	0.246	0.269	0.186						
1.5		0.086	0.227	0.244	0.229						
3		0.13	0.161	0.178	0.168						
6		0	0	0	0						
9		0	0	0	0						
Mean Dry Weight-mg Detail											
Conc-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Lab Water Contr	0.217	0.257	0.277	0.242						
0.75		0.251	0.273	0.299	0.186						
1.5		0.43	0.227	0.244	0.254						
3		0.26	0.201	0.222	0.21						
6		0	0	0	0						
9		0	0	0	0						

7 Day Chronic Fathead Minnow Reference Toxicant Test Data

Client: Reference Toxicant Organism Log#: 4993 Age: 248 hrs
 Test Material: Sodium Chloride Organism Supplier: Chesapeake Cultures
 Test ID#: 37373 Project #: 15610 Control/Diluent: EPAMH
 Test Date: 1-12-10 Randomization: 4-6-S Control Water Batch: 1225

Treatment (g/L)	Temp (°C)	pH		D.O. (mg/l)		Conductivity (µS/cm)	# Live Organisms				SIGN-OFF
		New	Old	New	Old		A	B	C	D	
Control	25.6	8.04		9.1		299	10	10	10	10	Date: <u>1/12/09</u> Test Solution Prep: <u>SM</u>
0.75	25.6	8.02		9.0		1957	10	10	10	10	New WQ: <u>SG</u>
1.5	25.6	7.99		9.0		3210	10	10	10	10	Initiation Time: <u>1750</u>
3	25.6	7.96		9.1		5950	10	10	10	10	Initiation Signoff: <u>MM</u>
6	25.6	7.90		9.3		11130	10	10	10	10	RT Stock Batch #: <u>40</u>
9	25.6	7.85		9.7		16060	10	10	10	10	
Meter ID	33A	pH14	RDO2			ECD3					
Control	25.1	8.23	8.12	9.0	8.5	341	10	10	10	10	Date: <u>1-13-10</u>
0.75	25.1	8.14	8.03	9.0	8.1	1841	10	10	10	10	Test Solution Prep: <u>SL</u>
1.5	25.1	8.15	7.92	9.0	8.1	3330	7	10	10	10	New WQ: <u>SM</u>
3	25.1	8.08	7.87	9.1	8.0	6050	10	9	10	9	Renewal Time: <u>1030</u>
6	25.1	8.03	7.81	9.4	8.2	11130	9	8	10	9	Renewal Signoff: <u>SH</u>
9	25.1	7.98	7.79	9.7	8.3	16230	3	0	2	2	Old WQ: <u>SL</u>
Meter ID	30A	pH14	pH12	RDO2	RDO2	ECD5					RT Stock Batch #: <u>40</u>
Control	25.6	8.10	8.31	9.0	6.5	3060	10	10	10	10	Date: <u>1/14/10</u>
0.75	25.6	8.06	8.22	9.0	6.8	1812	10	9	9	10	Test Solution Prep: <u>PL</u>
1.5	25.6	8.03	8.18	9.0	7.0	3240	6	10	10	10	New WQ: <u>PL</u>
3	25.6	7.98	8.15	9.0	7.1	8900	5	8	10	9	Renewal Time: <u>1255</u>
6	25.6	7.91	8.10	9.0	7.0	11130	4	3	8	4	Renewal Signoff: <u>PL</u>
9	25.6	—	8.04	—	—	—	0	—	0	0	Old WQ: <u>PL</u>
Meter ID	30A	pH03	pH14	RDO3	RDO1	ECD3					RT Stock Batch #: <u>41</u>
Control	25.1	8.10	8.15	8.2	7.2	309	10	10	10	10	Date: <u>1/15/10</u>
0.75	25.1	8.10	7.92	8.8	6.8	1782	9	9	9	10	Test Solution Prep: <u>an</u>
1.5	25.1	8.05	7.86	8.9	6.9	3300	6	10	10	10	New WQ: <u>SG</u>
3	25.1	7.99	7.83	9.1	6.9	6050	5	8	8	8	Renewal Time: <u>1325</u>
6	25.1	7.90	7.78	9.5	7.1	11160	1	0	5	1	Renewal Signoff: <u>an</u>
9	—	—	—	—	—	—	—	—	—	Old WQ: <u>SG</u>	
Meter ID	30A	pH12	pH14	RDO3	RDO2	ECD4					RT Stock Batch #: <u>41</u>

7 Day Chronic Fathead Minnow Reference Toxicant Test Data

Client: Reference Toxicant Organism Log #: 4993 Age: 248 hrs
 Test Material: Sodium Chloride Organism Supplier: Chesapeake Cultures
 Test ID #: 37373 Project #: 15610 Control/Diluent: EPAMH
 Test Date: 1-12-10 Randomization: 4-L-5 Control Water Batch: 1275

Treatment (g/L)	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms				SIGN-OFF
		new	old	new	old		A	B	C	D	
Control	24.9	7.86	7.88	9.1	8.5	312	10	10	10	10	Date: <u>1-16-10</u>
0.75	24.9	7.86	7.89	9.1	7.6	1800	9	9	9	10	Test Solution Prep: <u>JL</u>
1.5	24.9	7.84	7.82	9.2	7.6	3040	5	10	10	9	New WQ: <u>JT</u>
3	24.9	7.83	7.79	9.5	7.6	6020	5	8	8	8	Renewal Time: <u>1015</u>
6	24.9	7.81	7.77	9.7	7.7	11080	1	-	2	1	Renewal Signoff: <u>JPC</u>
9	-	-	-	-	-	-	-	-	-	Old WQ: <u>an</u>	
Meter ID	30A	pH14	pH14	RDO3	RDO3	Eco5					RT Stock Batch #: <u>41</u>
Control	25.2	8.05	7.96	9.1	8.4	307	10	10	10	10	Date: <u>1/17/10</u>
0.75	25.2	8.04	7.93	8.8	8.2	1897	9	9	9	10	Test Solution Prep: <u>JL</u>
1.5	25.2	8.01	7.90	8.9	8.1	3170	4	10	10	9	New WQ: <u>SG</u>
3	25.2	7.97	7.86	9.0	8.0	5960	5	8	8	8	Renewal Time: <u>1620</u>
6	25.2	7.91	7.82	9.5	8.1	10830	0	-	2	1	Renewal Signoff: <u>JL</u>
9	-	-	-	-	-	-	-	-	-	Old WQ: <u>SG</u>	
Meter ID	30A	pH14	pH14	RDO2	RDO2	Eco5					RT Stock Batch #: <u>41</u>
Control	25.0	8.15	7.87	9.3	6.9	319	10	10	9	10	Date: <u>1/18/10</u>
0.75	25.0	8.07	7.88	9.1	6.9	1810	9	9	9	10	Test Solution Prep: <u>JL</u>
1.5	25.0	8.05	7.82	9.0	6.8	3230	2	10	10	9	New WQ: <u>JL</u>
3	25.0	8.00	7.81	9.0	6.8	5830	5	8	8	8	Renewal Time: <u>1115</u>
6	25.0	7.94	7.84	9.4	6.9	11080	-	-	2	1	Renewal Signoff: <u>JL</u>
9	-	-	-	-	-	-	-	-	-	Old WQ: <u>BH</u>	
Meter ID	30A	pH12	pH001	RDO1	RDO3	Eco5					RT Stock Batch #: <u>41</u>
Control	24.7	8.12	8.06	8.4	322	10	10	9	10	Date: <u>1/19/10</u>	
0.75	24.7	8.06	8.06	8.3	1880	9	9	9	10	Termination Time: <u>1125</u>	
1.5	24.7	8.06	8.06	8.3	3310	2	10	10	9	Termination Signoff: <u>an</u>	
3	24.7	8.02	8.02	8.4	5990	5	8	8	8	Old WQ: <u>XO</u>	
6	24.7	7.98	7.98	8.4	11350	-	-	1	0		
9	-	-	-	-	-	-	-	-	-		
Meter ID	30A	pH14	RDO3	Eco3							

Fathead Minnow Dry Weight Data Sheet

Client:	<u>Reference Toxicant</u>	Test ID #:	<u>37373</u>	Project #	<u>15610</u>
Sample:	<u>Sodium Chloride</u>	Tare Weight Date:	<u>1-15-10</u>	Sign-off:	<u>FOUR</u>
Test Date:	<u>1-12-10</u>	Final Weight Date:	<u>1-22-10</u>	Sign-off:	<u>DJ</u>

Pan ID	Concentration Replicate	Initial Pan Weight (mg)	Final Pan Weight (mg)	Initial # of Organisms	Biomass Value (mg)
1	Control A	164.16	166.33	10	0.217
2	B	162.36	164.93	10	0.257
3	C	162.62	165.11	10	0.249
4	D	157.61	160.03	10	0.242
5	0.75 A	165.75	168.01	10	0.226
6	B	161.78	164.24	10	0.246
7	C	146.65	149.34	10	0.269
8	D	167.60	169.46	10	0.246180.186
9	1.5 A	178.57	179.43	10	0.086
10	B	186.10	188.37	10	0.227
11	C	158.15	160.59	10	0.244
12	D	167.47	169.76	10	0.229
13	3 A	167.46	168.76	10	0.130
14	B	178.91	180.52	10	0.161
15	C	170.32	172.10	10	0.178
16	D	137.56	139.24	10	0.1780.168
17	6 A	-	-	10	-
18	B	-	-	10	-
19	C	-	-	10	-
20	D	-	-	10	-
21	9 A	-	-	10	-
22	B	-	-	10	-
23	C	-	-	10	-
24	D	-	-	10	-
QA1		159.95	159.91		-
QA2		173.36	173.36		-
QA3		162.80	162.82		-
Balance ID:		#1	#1		